WASHINGTON STATE UNIVERSITY
COOPERATIVE EXTENSION

Agrichemical and Environmental News

A monthly report on pesticides and related environmental issues

In This Issue

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Hard-copy subscriptions are $15 a year. Mail check to above address, ATTN: Sally O'Neal Coates, Editor.

The Birth of the 'News

AENews Looks Back on 30 Years

Sally O'Neal Coates, Editor, *Agrichemical and Environmental News*

"Has it been that long?" asked Richard C. Maxwell, retired Washington State University (WSU) Pesticide Specialist and founding father of both WSU's Pesticide Information Center and its newsletter.

"Thirty years in January," I assured him. The tattered *Pesticide Report* I held in my hand was dated January 13, 1971.

This month marks this newsletter's thirtieth anniversary.

When I telephoned Dick Maxwell this past September, my mission was a stroll down Memory Lane to the origins of *AENews.* Along the way, my conversations with Eleanor and him touched on the history of their work with WSU in agricultural chemistry, the changes in the regulatory climate in the past forty years, and the evolution of the newsletter in the midst of it all.

Pesticide Report, predecessor of *Agrichemical and Environmental News (AENews),* began as a way for Maxwell and his assistant, Eleanor King, to communicate the increasingly complex world of pesticide regulations and environmental impacts to WSU researchers, specialists, and county agents involved with agricultural chemicals. The "roughly monthly" newsletter supplemented the letters, telephone calls, and presentations Maxwell used to communicate pesticide and environmental issues to WSU personnel and the agricultural community at large.

In the Beginning...

It is no coincidence that *Pesticide Report*'s inaugural edition came out the month after the U.S. Environmental Protection Agency (EPA) was formed. EPA's founding December 2, 1970, was the beginning of a chain of federal events leading up to the legislation that drives much of our environmental stewardship work today: the Food Quality Protection Act (FQPA) of 1996. But the founding of EPA was also the culmination of a chain of events. Many would trace the origins of that chain to the 1962 publication of Rachel Carson's *Silent Spring,* a landmark book alerting both the scientific

...continued on next page

Birth of the 'News, cont.

Sally O'Neal Coates, Editor, *Agrichemical and Environmental News*

community and the general public to concerns about pesticides in our environment.

Dick Maxwell came to WSU the same year *Silent Spring* was published—1962. As Agricultural Chemical Specialist with the Department of Agricultural Chemistry, his two main functions were

1. keeping people inside and outside WSU informed about laws and regulations affecting pesticides and their use, and

2. coordinating the field work for pesticide residues on crops. (The Interregional Research Program #4, or IR-4, would not be founded until 1964, but WSU was already conducting minor crop residue studies.)

His small staff in the Chemistry Building on the Pullman campus included an office assistant and a field worker. Today, Dr. Catherine Daniels (Pesticide Coordinator) handles the first function, with her staff of four employees at the Pesticide Information Center (PIC) on the Tri-Cities campus. The second function is under the direction of Dr. Doug Walsh (Agrichemical and Environmental Education Specialist) and his crew of five at WSU's Prosser research station.

One of the first major projects Dick initiated was the *WSU Pesticide Index* (commonly known around the office as "the binder"), a modular manual of registered crop-chemical-pest combinations. Information was organized by crop in a ring binder. Copies of the binder were provided to WSU county agents and other interested parties. Dick and his staff produced updates to the binder on a regular basis and also furnished copies of the U.S. Department of Agriculture's *USDA Summary of Registered Agricultural Pesticide Chemical Uses,* a comprehensive federal document organized by chemical.

The *WSU Pesticide Index* was the predecessor of today's Pesticide Information Center On-Line (PICOL) label database (on the Internet at URL **http://picol.cahe.wsu.edu**), where users can search among over 15,000 labels registered in Washington and Oregon by crop, chemical, or over a dozen other criteria.

Another key function of Dick Maxwell's office was conducting literature reviews. Existing literature was reviewed for information on pesticide toxicity and pesticide persistence in crops, soils, and water. The results of these reviews were used to support, modify, or deny pesticide recommendations made by WSU faculty, and to prepare educational materials for pesticide applicators and other users. Literature reviews were sometimes initiated as the result of requests from state agencies or the general public. The reviews sometimes served as a catalyst for a university research project. Today's Pesticide Information Center reviews WSU-affiliated pesticide recommendations, but does not perform literature searches; these are the authors' responsibility.

Literature reviews in particular and information dissemination in general were greatly supported by Eleanor King. Eleanor came on board as an Extension Aide in 1966, later became the office's Research Literature Analyst, and eventually functioned as the manager of the Pesticide Information Center.

Pesticide Report Emerges

The late 1960s were a busy time. Words like "environmental" and "ecology" were creeping into political and everyday language. The Clean Air Acts of 1963 and 1970 and the Air Quality Act of 1967 focused attention on airborne pollutants, while the transfer of the Federal Water Quality Administration (FWQA) to the Department of the Interior brought new vigor to the examination of pollutants in our water. In 1970, President Richard M. Nixon announced his thirty-seven-point environmental action program on February 10 and our nation celebrated its first Earth Day April 22. Citizens of the United States were aware of and concerned about their environment in an unprecedented way.

On January 13, 1971, Dick Maxwell released the first issue of *Pesticide Report.* In his introductory letter, he

...continued on next page

Birth of the 'News, cont.

Sally O'Neal Coates, Editor, *Agrichemical and Environmental News*

called the new newsletter "a pesticide information series that will attempt to keep you informed on pesticide laws, regulations, and environmental problems." The newsletter was not intended to be a substitute for the *WSU Pesticide Index* or the *USDA Summary of Registered Agricultural Pesticide Chemical Uses,* but a complement to it, just as today's *Agrichemical and Environmental News* is not a substitute for the PICOL label and tolerance databases or the Pesticide Notification Network (PIC's targeted information dispersal system that advises affected grower/commodity groups of regulatory changes potentially affecting their specific industry).

"You'll be hearing a lot about the new Environmental Protection Agency, (EPA)..." predicted the first issue.

The first issue of *Pesticide Report* featured articles on the federal regulation of chlorodioxin contaminants, polychlorinated biphenyls, and DDT/2,4,5-T; a statement on extension of the deadline for cancellations of registered pesticides still needing residue tolerances; a listing of crop-chemistry combinations for which tolerance petitions for no-residue registrations had been filed; a list of new tolerances granted; a list of temporary permits granted by USDA for use in states including Washington; and a list of highly toxic, restricted-use pesticides for which Washington State Department of Agriculture (WSDA) was requiring user permits. A short article invited readers to submit comments on mercury to the USDA. In closing the first issue, Maxwell told readers (prophetically?), "You'll be hearing a lot about the new Environmental Protection Agency (EPA)…." How right he was.

Subsequent issues continued to cover federal and state regulatory actions and followed the development of EPA (its new regional divisions were announced in February 1971 and proposed alterations to FIFRA were presented in March). Substantive articles (often transcripts of speeches or notes from conference proceedings) offered perspectives on integrated pest management (IPM), human health, ecological risks, IR-4, tolerances, and specific chemicals.

Then and Now

Those now-historic 1971 newsletters make interesting reading. Issues that seem black-and-white today were still being weighed ("Does DDT use really pose significant risk?") Institutions we take for granted (e.g., EPA, the Clean Water Act) were in their infancy. Terms were different, too—remember when "economic poison" was the common regulatory term for "pesticide?"

But for all its differences, *Pesticide Report* of 1971 had a lot in common with *Agrichemical and Environmental News* of 2001. Alternatives for soon-to-be-cancelled chemicals were discussed. Residues and risks were dissected with solid science and presented in laymen's terms. Important federal and state regulatory actions were detailed. And a touch of humor was present long before Dear Aggie or the Queen Bee of Labels graced these pages, before Catherine Daniels grappled with Harriet the Homeowner or Doug Walsh waxed poetic about the mating habits of the codling moth. Dick's "Tuna Contaminates Mercury" article, for example, in the April 20, 1971, edition, made this editor do a double-take.

Then, as now, the newsletter reached WSU county extension personnel, commodity groups, and key staff with the state departments of agriculture of Washington, Oregon, and Idaho. As it grew in popularity, others subscribed, and a base of academic, grower, and industry readership was added over the years.

Ag Chem Enters the Computer Age

By the mid-1970s, the volume of information Dick Maxwell and Eleanor King processed in Pullman had mushroomed. Like all information-

...continued on next page

Birth of the 'News, cont.

Sally O'Neal Coates, Editor, *Agrichemical and Environmental News*

intensive businesses, universities and regulatory agencies were looking toward computers to help them manage quantities of data. Working with software architect Kurt McMillen, Dick developed the Pesticide Label Information Retrieval System (PLIRS), which is still in use today as the root architecture for the PICOL Label Database. This system, a cooperative effort between Washington, Oregon, and Idaho, was funded by a regional grant and drew a great deal of attention. Dick and Kurt toured the United States showing other universities and interested parties how the system worked for managing and extracting useful data from complex pesticide labels.

The channels of communication established in the '60s and '70s are still enjoyed by the PIC staff today.

Cooperation was key in the early days. Dick developed strong collaborative relationships and communication channels with other states and with regulatory agencies. Besides starting the PLIRS database with Oregon and Idaho (Oregon continues to participate today), he worked with these and other states as Washington's representative to IR-4 and the Pesticide Impact Assessment Program (PIAP). When WSU's Department of Agricultural Chemistry was dissolved and Dick's office had no analytical chemists to draw upon, he relied on help from agricultural chemists and toxicologists at Oregon State University. Within Washington, the communication lines he established with WSDA, the Department of Ecology, and the Department of Labor and Industries are still strong. On the federal level, Dick's connection with the USDA dated back to the early 1960s, and continued through the early days of the EPA, establishing a foundation for the relationships enjoyed and maintained by the Pesticide Information Center today.

Fast-Forward 30 Years

Today, *Agrichemical and Environmental News* is produced from the Pesticide Information Center (PIC), a division of the Food and Environmental Quality Laboratory (FEQL), both of which are housed on the Tri-Cities branch campus of WSU in Richland. (Note that Dick Maxwell, along with Bob Harwood, then Assistant Director of the WSU Agricultural Research Center, were involved on the ground floor of the FEQL as well. Dick and Bob toured other labs and helped determine the physical structure of the new Tri-Cities facility.) FEQL staff in Richland include Dr. Catherine Daniels, Pesticide Coordinator, director of PIC, and Managing Editor of *AENews;* Dr. Allan S. Felsot, Environmental Toxicologist; and Dr. Vincent Hebert, Analytical Chemist and Laboratory Research Director. Dr. Doug Walsh, whose office is located at the Irrigated Agriculture Research and Extension Center (IAREC) in Prosser, rounds out FEQL as Field Research Director.

The newsletter itself has undergone a number of changes from its original hand-typed, mimeographed format. The amount of original research and analysis presented in *AENews* has increased. It remains a content-driven, economically produced publication emphasizing news of importance to the agricultural community of Washington State and the Pacific Northwest. In addition to the hard-copy (paper) version, we produce an electronic (web-based) version each month that contains additional Federal Register and tolerance information and links to other articles and websites. Because of its easy access (provided in both HTML and PDF formats), no charge, additional coverage, and early release (often a week before the hard-copy version hits the mail), the electronic version gains in relative importance each year.

In fact, as I concluded a pleasant lunch with Dick Maxwell near his home on Whidbey Island in October, he asked me to add his name to the list of "e-subscribers," individuals who receive monthly e-mail notification when the electronic version of *AENews* goes on line. (See self-subscribe instructions at **http://www.tricity.wsu.edu/aenews**.) Although Dick has been retired from WSU for a decade, he still main-

...continued on next page

Birth of the 'News, cont.

Sally O'Neal Coates, Editor, *Agrichemical and Environmental News*

tains an interest in the increasingly complex world of agrichemicals. Or perhaps the founder of our newsletter, just like you, is fond of what we at the PIC like to call the "riveting reading" found in these pages each month.

So thanks from me, your humble Editor for a mere two years:

- to Dick and Eleanor, for starting it all;
- to Managing Editor Catherine Daniels, for keeping content on track and quality high;
- to Allan Felsot, whose incisive articles have developed a near "cult" following;
- to Alan Schreiber, whose leadership drove the newsletter from 1994 to 1997;
- to contributing authors throughout the WSU system,
- to our colleagues at WSDA, the University of Washington, and Oregon State University, who take time out of their busy schedules to make important contributions to these pages; and, most of all
- to you, the readers who have perused issue after issue over all or part of the past thirty years.

Sally O'Neal Coates is an Editor of Research Publications with Washington State University Tri-Cities. She has been Editor of Agrichemical and Environmental News *since October 1998, and can be reached at (509) 372-7378 or* ***scoates@tricity.wsu.edu****.*

Western Precision Agriculture Conference

Designed to provide the broadest, most comprehensive information about precision farming in the western United States, the Western Precision Agriculture Conference is being held January 29 through 31 in the Tri-Cities. Sponsored by the Washington State University Center for Precision Agriculture Systems and Washington State University Conferences and Professional Programs, the conference is designed to help attendees learn how to maximize profitability by matching crop production practices and inputs to the needs of their unique field areas.

January 29–31, 2001
Tri-Cities, Washington
(800) 942-4978 or (509) 335-3530
http://capps.wsu.edu/programs/+programs_agriculture.htm

New to this year's conference is a hands-on precision agriculture (GIS, GPS) workshop to be held at the Consolidated Information Center on the WSU Tri-Cities campus. Space is limited, so register early. All other sessions and exhibits will be at the Pasco DoubleTree Hotel (800-222-TREE or 509-547-0701). Registration is $189 before January 10, and $229 thereafter. The hands-on precision ag workshop is $40 per session, or $120 for all three sessions (see website or request a brochure for details). Continuing Education Units and Certified Crop Advisor credits are available.

Page 6
◆
Agrichemical & Environmental News
◆
Jan. 2001
No. 177

Analyzing Analysis

A Detection Methods Retrospective

Dr. Vincent Hebert, Analytical Chemist, WSU

Since the inception of this newsletter thirty years ago, the capability to determine pesticide residues in our food supply has changed dramatically. Analytical chemistry and instrumentation have become increasingly sophisticated. These advances have made it possible to detect infinitesimal quantities of almost anything. But just because a pesticide can be detected, does that necessarily make it harmful?

1950s to 1960s

To adequately review analytical advances of the past thirty years, we need to go back a bit further—to the 1950s. In those days gravimetric techniques were the principal methods for trace-level residue analysis. Gravimetric methods use chemical precipitation, filtration, drying and/or combustion toward estimation of the analyte's mass. Using these crude methods, few detection levels approached the part-per-million range (Figure 1).

Although gravimetric methods were sufficient for tolerance enforcement of the old mainstay inorganic arsenical pesticides, the newer-generation chlorinated organics required a different approach. Colorimetry and spectroscopy methods offered greater precision. Wet-chemistry-based workups were developed that altered the spectroscopic properties of substances such as DDT and made them suitable for colormetric determinations. These methods offered some advantages, but were tedious and still imprecise.

Soon, chromatographic methods made inroads into resolving separate components from a mixed solution. Chromatography is a physical method of separation that relies on the interaction of substances within a mixture when they are exposed to both a stationary and a mobile phase. For example, remember the childhood experiment of placing a freshly cut celery stalk in a well of India ink? The ink pigments separate into their discrete colors as the ink migrates by (mobile) capillary forces up the (stationary) celery stalk. This illustrates chromatography—the elements in the mixture separate from each other as a result of repeated sorption/desorption acts during the movement along the stationary bed. Early thin-layer chromatography (TLC) and paper chromatography (PC) techniques used in the '50s and '60s separated compounds that were detected by measuring their intensity using ultraviolet and visible spectroscopy techniques.

1970s to mid-1990s

Gas and high performance liquid chromatography (GC and HPLC) were developed in the 1960s but came into their own in the 1970s, becoming the methods of choice for pesticide residue analysis and replacing TLC and PC. GC and HPLC techniques efficiently "resolve" individual components from a complex mixture and can precisely quantitate how much of an individual substance is present in the mixed component sample. The primary difference between GC and HPLC is that the former relies on resolution of substances being swept through a chromatography column in the gas phase at elevated temperatures while the latter relies on the substance in solution being chromatographically separated when in contact with a solid stationary phase.

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REGULATORY MILESTONES OF THE 1950s

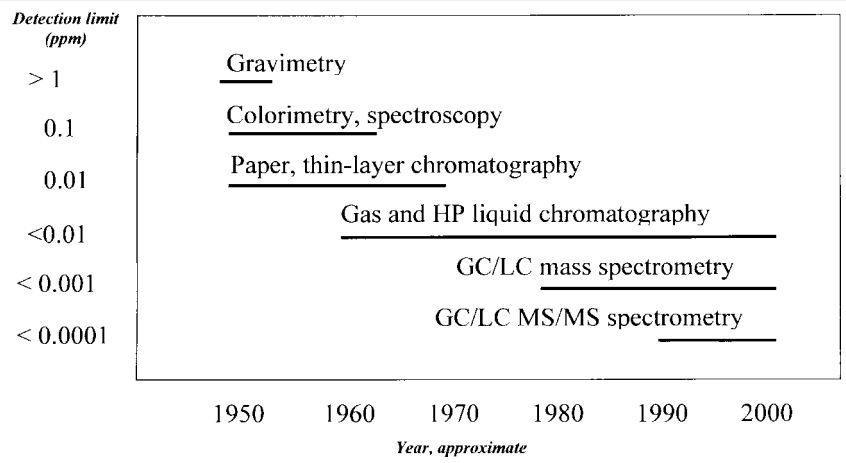
Beginning in the mid-1950s, epidemiological studies showed an increasing incidence of cancer deaths in the United States. Public alarm spurred Congress to enact various food safety initiatives, including the Delaney Clause of the Federal Food, Drug and Cosmetic Act (FFDCA). The Delaney Clause legislated anti-cancer provisions for color and food additives, succinctly stating "no additive shall be deemed safe if it is found to induce cancer when ingested by man or animal." No reference to quantity or dose was made. Any substance implicated in cancer causation found in processed food at levels above the tolerance for that substance in the raw agricultural commodity invoked the clause. Since some tolerances were set at "detectable levels," this led to problems in the coming decades as detection levels dropped.

Analyzing Analysis, cont.

Dr. Vincent Hebert, Analytical Chemist, WSU

FIGURE 1

Evolution of Analytical Methodology for Pesticide Residues in Foods



Adapted from *Pesticide Residues in Foods: Methods, Techniques and Regulations*. W.G. Fong, H.A. Moye, J.N. Seiber and J.P. Toth, eds. John Wiley and Sons, NY.

REGULATORY MILESTONES OF THE 1970s to MID-1990s

During the period from the 1970s to mid-1990s, the rapidly increasing ability to detect lower levels of pesticides in crop commodities raised serious concerns within the agriculture and agrichemical industries. Because of increasing analytical capability, pesticides that had never been considered a problem in processed foods were now being detected and were therefore susceptible to the strict interpretation of the Delaney Clause. Delaney allowed no administrative discretion or scientific judgment in establishing safety tolerances for pesticides suspected as carcinogens in processed foods that exceeded raw agricultural commodity tolerances. In certain cases, the pesticide industry voluntarily reduced the number of applications of a particular pesticide on a particular crop. Corn, for example, saw a voluntary reduction in the use of certain pesticides to avoid potential residues in corn oil. Residues found in corn oil would not only have affected the processed food use, but could have shut down use of the subject chemical on the raw agricultural commodity as well.

Gas Chromatography: GC is most applicable to pesticides of relatively high thermal stability and low polarity. These pesticides are easily extracted from their crop, soil, or water matrix with an organic solvent. In many cases, GC analysis can be performed on a polar analyte (often an oxidative breakdown product of the parent pesticide), providing the analyte can be chemically altered and made more volatile. A number of detectors are highly sensitive and selective for pesticides containing halogens (i.e., chlorine and fluorine), nitrogen, and/or phosphorus; these instruments can yield detections approaching 0.01 ppm (Figure 1). GC remains the method of choice for routine analysis of most chlorinated organic, organophosphorus, carbamate, and pyrethroid insecticides.

Mass spectroscopy (MS) developments in the mid-1980s dramatically enhanced the scope of detection to include most semi- to non-polar, thermally stable pesticides in use at that time. The first generation combined GC-mass spectrometers relied on Electron Impact Ionization (EI) to fragment the pesticide molecule into an array of positive mass ions. Like pieces of a puzzle, the mass ion fragment information could then be deciphered to establish the identity and quantity of the pesticide residue. GC/MS detection for many pesticide residues in crops were found to be lower than 0.001 ppm.

High Performance Liquid Chromatography: HPLC offered an alternative to GC in that it was applicable to practically any organic substance solute regardless of its volatile properties or thermal stability. It also had greater separation power than GC. Its major disadvantage during its early development was less detector sensitivity than GC.

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Analyzing Analysis, cont.

Dr. Vincent Hebert, Analytical Chemist, WSU

However, for certain analytes that could fluoresce or be chemically modified to fluoresce under UV illumination, HPLC sensitivity could approach or exceed that of GC.

Mid-1990s to Present

Continued refinement in GC/MS and the maturation of HPLC-mass spectrometry have resulted in increasingly sensitive instruments and residue detections at even lower levels. Today's GC/MS instruments have five to ten times greater EI sensitivity than their predecessors. Bench-top laboratory instruments now come with softer ionization interfaces that increase instrument sensitivity an additional 2X to 4X, lowering the limit of detection for many pesticide residues in crops to below 0.0001 ppm. Advances in MS for HPLC, particularly improvements in the Atmospheric Pressure Ionization (API) mass spectrometers have been astounding in the last five years, revolutionizing pesticide residue analysis. Overall, the advances in instrumentation and technology have provided the analytical chemist with very powerful tools to rapidly and precisely measure extremely low levels of highly polar pesticide residues and their breakdown products. Today's technology allows analysis of virtually any matrix without the need for multi-step cleanup and chemical modification. These features are also very attractive in multi-residue tolerance enforcement procedures.

Summary

Over a very short period of time, we have come a long way: from gravimetric, wet-chemistry methods to highly sophisticated chromatography and spectrometry; from residue measurements in parts per thousand to fractions of parts per million. Unfortunately, our capability to use science for making sound regulatory decisions has lagged behind. While both the regulatory and science communities will agree there is probably little scientific basis for setting "zero" standards for pesticide residues in foods, public perceptions will continue to exert the greatest influence on legislation.

Dr. Vincent Hebert is an Analytical Chemist with WSU's Food and Environmental Quality Laboratory. He can be reached at (509) 372-7393 or ***vhebert@tricity.wsu.edu.***

Risk Assessment Conference

The University of Washington Department of Environmental Health has announced "Concepts and Advances in Risk Assessment," a one-day conference to be held April 11, 2001 in Seattle. The course will provide an introduction to risk assessment as well as information on advanced applications. Attendees will learn:

what types of public health data are used to prepare risk assessments;

how quantitative risk assessment methods and approaches are used;

which statistical concepts underlie risk assessment;

how biomarker information is used in occupational surveillance decisions;

which approaches help evaluate cancer and non-cancer risks; and

where to go for more information on risk assessment.

The course brochure should be available by the end of January. For more information, contact Julie Schmitz at (206) 543-1069 or check the website: **http://depts.washington.edu/envhlth/conted/ce/index.html.**

Analyzing Analysis, cont.

Dr. Vincent Hebert, Analytical Chemist, WSU

REGULATORY MILESTONES OF THE MID-1990s to PRESENT

The rapid advancements in instrument sensitivity and reliability in the mid-1990s could not have come at a better time. In 1996 Congress passed the Food Quality Protection Act (FQPA). This statute amendment struck down the zero-risk criterion of the Delaney Clause, but replaced it with a National Academy of Sciences recommendation that EPA use a more consistent single standard of "reasonable certainty of no harm" for both raw and processed foods. Under this new standard, the EPA has been assigned the job of reevaluating all currently used pesticides for their potential harm to infants and children. Additional safety factors of up to 10X can be incorporated into the total level of acceptable risk as a margin of safety for children. Furthermore, aggregate and cumulative effects of exposure to pesticides with a common mode of action are now elements in EPA's decision of registering additional uses and setting new tolerances. The greatest impact of these new regulations will likely be the continued trend in voluntary cancellations and reduction in the number of allowed uses for highly effective organophosphorus (OP) and carbamate pesticides in minor crops.

Because of the new "reasonable certainty of no harm" mandate, it will be critically important to reassess analytical limits of detection, especially for those crop commodities that have exceedingly minute or near-zero residues. The EPA now assumes in its risk assessment calculations that a pesticide is present in the commodity at one-half the reported lowest level of detection. Often, the dietary exposure will be calculated using older (pre-1990) analytical methodologies that are insensitive and can artificially inflate exposure. Establishing a lower level of detection for pesticide residues using today's state-of-the-art instrumentation may result in "essentially zero" risk. For example, if residues cannot be detected at 1/1000 of an acceptable level of risk, a tolerance may not be required. Further, if residues cannot be detected at 1/10th of the method limits of quantitation (i.e., the lowest concentration of an analyte in a residue sample for consistent and reliable quantitation) for foods that have no detectable residues in market-basket surveys, a tolerance also may not be needed. These considerations become critically important, especially for retaining minor crop uses of "high risk" OP and carbamate pesticides. However, these particular substances have a common mode of action. Under FQPA, the total of all pesticides in a similar class of biological activity (e.g., cholinesterase inhibition) may be held to one maximum residual level (e.g., all OP use and possibly carbamate tolerances on a crop commodity are cumulative). If carried through, this provision of FQPA may eliminate nearly all uses of these highly effective pesticides in food, even after scientific reassessments of dietary exposure.

Precision Forestry Call for Abstracts

The Precision Forestry Cooperative (PFC, **http://www.cfr.washington.edu/research.pfc/**) will hold its First International Precision Forestry Symposium June 17 through 19, 2001, in Seattle.

PFC was founded as part of the Advanced Technology Initiative (ATI) funded by the Washington State Legislature. The University of Washington's College of Forest Resources, in collaboration with the College of Engineering, created the Precision Forestry Cooperative to conduct pioneering research in forest production, management, and manufacturing at a new scale of resolution and accuracy with the goal of producing economic and environmental benefits (see "Precision Forestry: Making Progress in Washington State," *AENews* Issue No. 175, Nov. 2000).

Those wishing to present a paper or poster at the symposium should submit a tentative title and abstract **by January 15, 2001,** to Megan O'Shea by e-mail at **moshea@u.washington.edu** or by fax at (206) 685-3091.

Pesticide Applicator Training Courses 2001

Washington State University provides pre-license and recertification training for pesticide applicators.
Pre-license training provides information useful in taking the licensing exam.
Recertification (continuing education) is one of two methods to maintain licensing.
(The other is retesting every five years.)

Course registration (including study materials) is $35 per day if postmarked 14 days prior to the first day of the program you will be attending. Otherwise, registration is $50 per day. These fees do not include Washington State Department of Agriculture (WSDA) licence fees.

For more detailed information, visit the Pesticide Education Program website's training page at
http://pep.wsu.edu/education/educ.html

PRE-LICENSE

EASTERN WASHINGTON			WESTERN WASHINGTON		
Date	**City**	**Facility**	**Date**	**City**	**Facility**
Jan. 16, 17, 18	Pasco	Doubletree	Jan. 2, 3, 4	Vancouver	WSU Vancouver
Jan. 22, 23, 24	Yakima	Conv. Center	Jan. 9, 10, 11	Tacoma	Pac Lutheran U
Jan. 30, 31 Feb. 1	Pullman	University Inn (Moscow)	Feb. 6, 7, 8	Kirkland	Lake WA Tech College
Feb. 6, 7, 8	Spokane	Valley Doubletree	Mar. 13, 14, 15	Puyallup	WSU Puyallup Allmendinger Ctr
Feb. 13, 14, 15	Moses Lake	Conv. Center	Mar. 27, 28, 29	Bellingham	Whatcom Comm. College

RECERTIFICATION

EASTERN WASHINGTON			WESTERN WASHINGTON		
Date	**City**	**Facility**	**Date**	**City**	**Facility**
Jan. 17, 18	Pasco	Doubletree	Jan. 3, 4	Vancouver	WSU Vancouver
Jan. 23, 24	Yakima	Conv. Center	Jan. 10, 11	Tacoma	Pacific Lutheran University
Jan. 25, 26	Wenatchee	Doubletree	Jan. 18, 19	Lynnwood	Edmonds Comm. College
Jan. 30, 31	Pullman	University Inn (Moscow)	Jan. 29, 30	Lacey	St. Martin's Coll. Worthington Ctr.
Feb. 7, 8	Spokane	Valley Doubletree	Feb. 1, 2	Des Moines	Highline Comm. College
Feb. 14, 15	Moses Lake	Conv. Center	Feb. 7, 8	Kirkland	Lake WA Tech. College
SPECIAL WORKSHOPS include Integrated Plant Health Jan. 23-25, Puyallup; Conifer/Christmas Tree Jan. 29, Lacey; and Commercial Applicator Feb 9, Spokane			Feb. 13, 14	Port Orchard	Givens Comm. Center
			Mar. 8, 9	Seattle	UW Ctr. For Urban Hort.
			Mar. 27, 28	Bellingham	Whatcom Comm. College

Oregon Phasing Out License Reciprocity

Page 11
Agrichemical & Environmental News
Jan. 2001
No. 177

Beginning January 1, 2001, the state of Oregon will no longer accept new public or commercial pesticide applicator or pesticide consultant licenses from Washington or Idaho as reciprocal license equivalents. There will be no change in reciprocity for private applicator licenses.

The Oregon Department of Agriculture (ODA) announced earlier this year that reciprocity with Idaho and Washington had become increasingly difficult to maintain due to the differences in the three states' certification and licensing programs, as well as differences in certification period, license duration, and license categories. Only the private applicator program remains relatively consistent between states.

In an effort to minimize the impact of this change for current license holders, ODA will be issuing fully certified licenses for all persons applying for a *renewal* of a reciprocal license.

Those individuals with established reciprocal licenses will follow these steps to renew their reciprocal license:

- The pesticide license holder receives a 2001 renewal application.
- The license holder returns the application, appropriate fee, and a copy of a 2001 Washington or Idaho license to ODA (standard reciprocal procedure).
- ODA issues the appropriate Oregon pesticide license with a certification period from 01/01/01 to 12/31/05. The license holder becomes a certified applicator or consultant in Oregon.
- The license holder must sign Oregon recertification attendance forms at any recertification training course to obtain credits toward Oregon recertification. If Oregon attendance sheets are NOT available at a recertification program, no credit has been assigned for Oregon licenseholders. ODA does not assign credits for attending programs that have not been pre-approved.

Any person wanting to be licensed for the first time in Oregon must take, and pass, the Oregon certification examinations for the license type desired.

For more information, refer to the ODA website at **http://www.oda.state.or.us/pesticide/info.html**, or contact Janet Fults at (503) 986-4635. A list of frequently asked questions can be viewed at **http://www.oda.state.or.us/pesticide/reciprocal.html**.

Herbicide Company Genealogy

Arnold P. Appleby, Professor Emeritus in Crop Science at Oregon State University, has posted an interesting project on the Internet. Using personal interviews, memory, and other admittedly inexact methodologies, he has compiled a "family tree" of herbicide companies in the United States over the past half century. If you think the history of agrichemical regulation has been convoluted in the past thirty years, take a look at this!

http://www.css.orst.edu/herbgnl/tree.PDF

Page 12
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Thin Eggshells & Pregnant Chads

Toxicological Signposts on the Bridge to the 21st Century

Dr. Allan S. Felsot, Environmental Toxicologist, WSU

I sat riveted to my TV in late November watching the latest phase of the Presidential election. The "trial" of the contest phase, which followed the second official certification of the Florida vote count, was being televised and the witnesses for the plaintiff were being coddled by their lawyer and excoriated by the lawyer for the defense. Of course, courteousness and civility reigned. And then it hit me. The discourse wasn't really about election interruptus, it was about our failure to understand the uncertainties associated with measurement and mistaking correlation for causation. When I viewed the whole mess in terms of science (i.e., what principles do we use to create and test hypotheses?) I wasn't going to be dragged from my TV set without kicking and screaming.

The Virtual Reality of Measurement

The imprecise and inaccurate nature of casting and counting votes, hidden from our view until now, struck me as parallel to the way we go about trying to decide whether the plethora of modern society's by-products are adversely affecting our health. As Dr. Hebert points out in his article beginning on page 6, our ability to measure contaminant residues is greater than ever. But residue measures are virtual realities (14). Why virtual? Because every time we sample soil, water, plants, or organisms and measure pesticide X, we come up with a different number. Stated differently, there is a *distribution* of possible residue numbers. Measurement, by its very nature, is imprecise. The "true residue" can only be estimated, always with some degree of uncertainty.

While generating numbers has become increasingly easy, assigning meaning to residue data is more difficult than ever. Toxicologists used to have an easy life. They could always tell when exposure to a hazardous chemical was too much—it would kill an animal or at least do some notable damage. The endpoints were obvious. Fifty years ago, we didn't see things at parts per billion or parts per trillion levels. Now that we are measuring some contaminants at parts per quadrillion levels, we know we are exposed to literally everything. Yet life seems to merrily go on. Much of today's "virtual reality" for the toxicologist involves chronic exposures, minuscule residues, and no discernible effects within a reasonable timeframe.

Cancer Correlation Is Not Causation

What about all those scary headlines asserting links between cancer and chemical X, Y, and Z? The problem with those headlines is that they are based on environmental epidemiological studies, all of which attempt to correlate exposure with some adverse outcome. But environmental epidemiological studies don't usually measure exposure. This is particularly true for pesticide studies, where next of kin are often interviewed to get an idea about what the "man" of the house was using before he succumbed. Closer examination of many epidemiological studies shows that the statistical significance of the headline associations between "exposure" and effect may be highly exaggerated or nonexistent (10).

Even studies using chemical contaminants in tissues like blood or fat as surrogates for exposure have failed to show definitive relationships between residues and effects. For example, a 1993 study linking breast cancer and DDE (the major metabolite of DDT) levels in women's blood (32) received national publicity that was followed by hearings in Congress. Although it has been recognized that breast cancer incidence among women rose in the 1980s and early 1990s, several studies subsequent to the 1993 study disputed links between DDE residues and breast cancer incidence (20). The concern over breast cancer is warranted, but our ability to figure out what role exogenous factors like low levels of environmental contaminants play in disease rates among the general population is practically nonexistent. In other words, it's easier to produce a residue number than it is to say what that number means.

Until fairly recently, public concern with environmental

...continued on next page

Eggshells & Chads, cont.

Dr. Allan S. Felsot, Environmental Toxicologist, WSU

contaminants seemed to center on cancer. But an evolving understanding of the mechanism of carcinogenicity and a consensus that high-dose rat feeding studies are not predictive of low-level environmental exposures has tended to downplay the relationship between environmental contaminants and cancer incidence (1). A National Academy of Sciences 1996 report (22) gave strength to the idea that contaminants are not problematic for the general population with regard to cancer causation. And the good news during the 1990s continued with reports from the National Cancer Institute that incidence of many cancers was declining and the rates of increase of breast cancer were slowing to a standstill (30, 31).

Forget cancer. Endocrine disrupters are making all the headlines as we enter the 21st century.

Hijacked by a New Paradigm?

But peace and quiet on the cancer front gave way in 1996 to *Our Stolen Future*. This highly publicized book by principal author Theo Colborn asked the question in its subtitle "Are we threatening our fertility, intelligence, and survival?" Forget cancer. Forget knocking off a few fish with insecticide runoff. Synthetic chemicals are striking at the very heart of life on earth. With a forward by Vice President Al Gore proclaiming the book to be the sequel to Rachel Carson's *Silent Spring*, one just assumes it must be a publication of great integrity.

Disagreement with *Our Stolen Future*'s premise abounds among more skeptical scientists, especially those representing sectors of the economy impugned by the book. Individuals can argue back and forth all day long about the validity of the book's claims, but I believe its true relevance lies in what it represents. *Our Stolen Future* stands as a bridge to the 21st century for environmental advocates who were wondering what to do with their time now that the cancer scare associated with environmental levels of residues seems to have petered out. *Our Stolen Future* presents a comprehensive hypothesis linking just about every adverse effect under the sun to environmental contaminants affecting the endocrine system.

Linking chemical toxicity to effects on the endocrine system is an attention-getting strategy. After all, the endocrine system is linked with the nervous and immune system and has a controlling influence on reproduction, development, growth, and everyday physiology. Given that all the systems communicate with one another in feedback loops, just like a computer network, an adverse effect anywhere in the system can muck up the whole works. In essence, just about any adverse effect noted by a chemical could be interpreted as one of direct or indirect endocrine system disruption.

As the 1990s came to a close, *Our Stolen Future* succeeded in shifting the paradigm of "high doses cause discernible effects" (based on studies of rodents in laboratories) to "environmental exposures cause subtle effects" (on reproduction, the immune system, and behavior–effects that are not noticed until long after an exposure has taken place). All of a sudden, disparate hypotheses to explain endocrine-system-related cancers of the breast and prostate and adverse effects on reproductive systems came together under one roof. Exposure no longer needed to be at the levels associated with laboratory studies. Fetal exposure became a focal point, very much in keeping with the mandate of the Food Quality Protection Act of 1996 to manage pesticide risks for the protection of infants and children.

Walking on Eggshells

It's not every day that the public is treated to a shift in toxicological paradigm. Thirty years ago we were dealing with pesticide residues like DDT and industrial chemicals like PCBs that

...continued on next page

Eggshells & Chads, cont.

Dr. Allan S. Felsot, Environmental Toxicologist, WSU

accumulate in body fat because they are metabolized and eliminated from the body very slowly (7). We weren't sure if they could build up to hazardous levels, although we knew that dead birds had very high levels of DDE in their brains (8). DDE being a neurotoxin, it was reasonable to assume that high levels would not be good for birds. Invoking the cancer scare, EPA banned DDT officially in 1973, and by 1979 PCBs fell from grace. The emphasis was still on high levels—buildups sufficient to cause an adverse effect. But the toxicological paradigm shift began a few years earlier with hypotheses that DDE did not have to be at "high" levels to affect bird populations. Instead, DDE levels commonly occurring in the environment were associated with avian reproductive failure by causing eggshell thinning (24).

When our national symbol, the bald eagle, begins to experience a population decline, people pay attention. The eggshell-thinning hypothesis with links to accumulation of DDE was a smoking gun. During the 1970s and early 1980s numerous papers reported DDE levels in bird eggshells and correlations with the thickness of those shells (8). Using correlative statistics (which show association, not causation), scientists hypothesized that populations of several predatory and fish-eating birds were declining as thinner-shelled eggs failed to hatch successfully (9, 19).

Some scientists remained skeptical of DDT's effects on declining bird populations (as opposed to individuals), and a few questioned the premise of the relationship between DDE levels and eggshell thinning (17, 28). Some laboratory studies corroborated this association and some did not. The experiments did not clearly show that hatchability was sufficiently affected to cause the reported population declines. Neither was it ever made clear to the public that the standard for determining the amount of eggshell thinning was based on comparison to museum specimens collected from different parts of the world before DDT was commercialized (2, 19). One particular observation has always vexed me, however. Not too long after DDT's demise, reports of increasing populations of various birds began to appear (3). Knowing that DDE lasts "forever," I wondered how all of a sudden bird populations with DDE still in their eggs were now making such a quick comeback.

Following the effects of Carson's *Silent Spring* in the 1960s and throughout the publicity of eggshell thinning in the 1970s, DDT became a symbol of everything bad about pesticides. After the banning of DDT and the continued rise in the use of the more acutely toxic organophosphate insecticides, the number of eggshell thinning studies began to wane. Although DDT was banned, scientists over the last thirty years never stopped studying it. But the 1990s brought a new respectability to DDT studies. Now the hunt was on to link DDT and recalcitrant chlorinated pesticides to adverse effects on the endocrine system.

Bye-Bye, Babies?

The list of adverse effects associated with endocrine disruption has grown. So has the list of chemicals that react positively in the test-tube-type procedures used for testing this phenomenon. Sex makes good headlines, so stories of worldwide declining sperm counts have become a mainstay over the last decade. Never mind that no real decline in sperm count has ever been proven. Like pesticide epidemiological analyses, conclusions of sperm count declines are based on correlational analysis. But there is a catch—disparate sperm count studies over numerous years have been combined by meta-analysis as if they were a single data set (13, 27).

One problem with meta-analysis is the variable standards that different observers use to measure sperm counts. A second problem is the statistical model one applies to the data (11, 18). Depending on your perspective, you will either see a linear decline in sperm counts from the late 1930s to the present (16, 27) or a slight increase over the last decade and a half (23). Of course, such differences in opinion have not prevented alarming conclusions linking sperm count declines to industrial and agricultural pollution (21, 25).

...continued on next page

Eggshells & Chads, cont.

Dr. Allan S. Felsot, Environmental Toxicologist, WSU

Dose Deceptions?

Part of the toxicological paradigm shift wrought by *Our Stolen Future* has been a questioning of the shape of the dose-response relationship. In 1997, one researcher in particular hypothesized that for chemicals reactive with the estrogen receptor (a key endocrine system component) low doses could cause adverse effects not seen at high doses, absent systemic toxicity (29). For example, feeding rats with low doses of the drug diethylstilbesterol (DES) caused enlarged prostate glands, an effect that did not occur at higher doses. In other words, the shape of the dose-response curve was inverted. DES was an anti-miscarriage drug given to pregnant in women during the late 1950s and 1960s. It garnered a notorious reputation in the 1970s when it was discovered to have severe side effects, including reproductive-tract cancers and low fertility in offspring. DES is one of the few existing chemicals proven to have potency equal to the natural estrogen hormone. Many of the researchers jumping on the endocrine-disrupter hypothesis in the 1990s had been studying DES during the 1970s.

While low-dose DES studies garnered public attention and set off alarm bells, little has been said about studies showing effects opposite to the so-called inverted dose-response (5). With little fanfare, a study was published in 1999 completely refuting the results of the DES study (12). Furthermore, the 1999 study showed that another controversial chemical, bis-phenol A, also exhibited the standard old-paradigm relationship: any effects on the prostate gland are directly related to dose. Exposures to bis-phenol A are probably ubiquitous as the chemical leaches at very low levels from certain plastics and the polymer linings of tin cans.

Another controversial issue regarding endocrine disrupters has been the effects of exposure to multiple chemicals. One prominent EPA policy maker exuded fear in response to a 1996 Tulane University study showing that combinations of pesticides synergistically activated the estrogen receptor (4). In other words, the individual pesticides were of low potency, but when mixed together they had very prominent effects. When Tulane researchers withdrew their study in 1997 on the grounds that it was unreplicable, the action drew little notice. Since that time, numerous researchers have shown combinations of chemicals reacting with the estrogen receptor act simply in an additive manner, not a synergistic one (15, 26).

The Certainty of Uncertainty

The bridge to the 21st century is paved with gold for environmental advocacy groups as the endocrine disrupter paradigms have taken hold of risk management. Witness the 1996 requirements imposed by Congress in the Food Quality Protection Act and the Safe Drinking Water Act for testing to determine whether any chemicals affect the endocrine system. But the requirement for testing will always be obscured by the interpretation of a positive result. One problem with the available testing systems is that a plethora of natural chemicals (including food biochemicals) known as phytoestrogens also test positive. Another problem is that the test-tube-type tests are sensitive over a 10-million-fold range in chemical concentrations. Thus, we're back to the high-dose testing strategy used for cancer—pump up the concentration until you get an effect. That's a nice strategy for figuring out possible effects of a chemical, but it will not give us useful answers regarding risk of an adverse effect until we can quantify real-world exposure.

As we lunge into the new millennium, we will continue to be bombarded by worries over synthetic chemicals. Such worries arise against a background of unprecedented human longevity and declines in many cancer rates. Worldwide fertility seems not to have suffered from endocrine disrupters. If it had, why would world population still be rising faster than we can accommodate it with current food production systems? Intelligence test scores in many countries have actually risen, not declined as *Our Stolen Future* would have us believe (6).

...continued on next page

Eggshells & Chads, cont.

Dr. Allan S. Felsot, Environmental Toxicologist, WSU

Yet despite the good news, we live in a world of uncertainty. We can measure synthetic chemical residues everywhere in the environment. As society demands that we lower our detection levels to see even smaller quantities, our measurements start losing their precision and accuracy. More importantly, what such low levels mean depends on who is doing the interpreting.

I guess the historic election impasse of the year 2000 has taught me a lot about toxicology. Pesticide residues are like pregnant chads. There seems to be a lot of them, but everyone is confused about what they really mean. Welcome to the 21st century!

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REFERENCES

1. Ames, B. N., L. S. Gold, and W. C. Willet. 1995. Proc. Natl. Acad. Sci. 92:5258-5265.
2. Anderson, D. W. and J. J. Hickey. 1982. Wilson bulletin 82:14-28.
3. Anderson, D. W., J. R. Jehl, Jr., R W. Risebrough, L. A. Woods, Jr., L. R. Deweese, and W. G. Edgecomb. 1975. Science 190:806-808.
4. Arnold, S. F., D. M. Klotz, B. M. Collins, P. M. Vonier, L. J. Jr. Guillette, and J. A. McLachlan. 1996. Science 272(June 7):1489-1492.
5. Ashby, J. 1999. Regulatory Toxicology & Pharmacology 29:235-237.
6. Begley, S. 1996. Newsweek May 6, pp. 70-72.
7. Bevenue, A. 1976. Residue Reviews 61:37-111.
8. Blus, L J. 1996. Environmental Contaminants in Wildlife: Interpreting Tissue Concentrations, W. N. Beyer, G. H. Heinz, A. W. Redmon-Norwood [Eds.] Lewis Publishers, Boca Raton, FL. Pp. 49-71.
9. Blus, L. J., C. D. Gish, A. A. Belisle, and R. M. Prouty. 1972. Nature 235:376-377.
10. Bond, G. G., K. M. Bodner, and R. R. Cook. 1989. Fundamental and Applied Toxicology 12:172-188.
11. Bromwich, P., J. Cohen, I. Steward, and A. Walker. 1994. British Medical Journal 309:19-22.
12. Cagen, S. Z. et al. 1999. Toxicological Sciences 50(36-44.
13. Carlsen, E., A. Giwercman, N. Keiding, and N. E. Skakkebaek. 1992. British Medical Journal 305:609-613.
14. Felsot, A. S. 1998. J. Environmental Law and Litigation, 13:91-113.
15. Gaido, K. W., et al. 1997. Chemical Industry Institute of Toxicology 17(2):1-7.
16. Giwercman, A., E. Carlsen, N. Keiding, and N. E. Skakkebaek. 1993. Environmental Health Perspectives Supplements 101 (2):65-71.
17. Hazeltine, W. 1972. Nature 239:410-411.
18. Heinze, J. 1998. Environmental Health Perspectives 106(8):369A-370A.
19. Hickey, J. J. and D. W. Anderson. 1968. Science 162(271-273.
20. Krieger, N., M. S. Wolff, R. A. Hiatt, M. Rivera, J. Vogelman, and N. Orentreich. 1994. J. National Cancer Institute 86(8):589-599.
21. Montague, P. 1996. Rachel's Environment & Health Weekly No. 477
22. National Research Council. 1996. National Academy Press, Washington, D.C. p. 5.
23. Olsen, G. W. and et.al. 1995. Fertility & Sterility 63(4):887-893.
24. Ratcliffe, D. A. 1967. Nature 215:208-210.
25. Sharpe, R. M. and N. E. Skakkebaek. 1993. The Lancet 341(May 29):1392-1395.
26. Smeets, J. M. W., I. van Holsteijn, J. P. Giesy, W. Seinen, and M. van den Berg. 1999. Toxicological Sciences 50(2):206-213.
27. Swan, S., E. P. Elkin, and L. Fenster. 2000. Environ. Health Persp. 108(10):961-966.
28. Switzer, B. C., F. H. Wolfe, and V. Lewin. 1972. Nature 240:162-163.
29. Vom Saal, F. S. and et.al. 1997. Proc. Natl. Acad. Sci. USA 94(2056-2061).
30. Wingo, P. A., L. A. G. Ries, H. M. Rosenberg, D. S. Miller, and B. K. Edwards. 1998. . Cancer 82(6):1197-1207.
31. Wingo, P. A., L. A. G. Ries, G. A. Giovino, D. S. Miller, H. M. Rosenberg, D. R. shopland, M. J. Thun, and B. K. Edwards. 1999. J. National Cancer Institute 91(8):675-690.
32. Wolff, M. S., P. G. Toniolo, E. W> Lee, M. Rivera, and N. Dubin. 1993. J. National Cancer Institute 85(8):648-650.

Diazinon Hits EPA's Chopping Block

Page 17
Agrichemical & Environmental News
Jan. 2001
No. 177

December 5, 2000, the U.S. Environmental Protection Agency (EPA) announced an agreement with manufacturers to phase out most uses of the agrichemical diazinon. The phase-out will begin March 2001 for indoor uses and December 2003 for lawn, garden, and turf uses.

Specifically, the phase-out works as follows:

- The registration for diazinon indoor household use will be cancelled March 2001, with all retail sales ceasing by December 2002.
- Manufacturing of diazinon for lawn, garden, and turf use ceases June 2003, with sales and distribution to retailers ceasing August 2003. Registrants will buy back remaining product from retailers at the end of 2004.
- The amounts of diazinon manufactured for lawn, garden, and turf use shall decrease prior to the cessation of production, with a twenty-five-percent reduction in 2002 and a fifty-percent reduction in 2003.
- The process begins for cancellation of agricultural use on alfalfa, celery, red chicory (radicchio), citrus, coffee, cotton, cowpeas, cucumbers, dandelions, forage, lespedeza, parsley, parsnips, peanuts, pecans, potatoes, rangeland grasses, sorghum, soybeans, strawberries, sugarcane, sweet potatoes, Swiss chard, tomatoes, and turnips. Cancellation will become effective after announcement in the Federal Register and a public comment period.

Until the dates listed, it is still legal to purchase and use diazinon products according to label directions. Those wishing to dispose of diazinon should contact their local solid waste disposal service or their state's pesticide disposal program. In Washington, contact the Washington State Department of Agriculture's Waste Pesticides at (877) 301-4555 or **wastepesticide@agr.wa.gov**.

Diazinon is one of the most widely used home and garden pesticides in the United States. It tops the list of lawn chemicals used by homeowners, and is an extremely popular agent for grub and insect pest control in gardens. It is also registered for certain agricultural uses.

Eliminating most diazinon uses, according to EPA Administrator Carol Browner, will significantly reduce "the vast majority of organophosphate insecticide products in and around the home…(and) help encourage consumers to move to safer pest control practice." The action is consistent with the Clinton-Gore administration's aggressive targeting of organophosphate pesticides, a class believed to pose the greatest risk to human health (especially children's health) and the environment.

The agreement reached December 5 between EPA and diazinon manufacturers Syngenta and Makhteshim Agan will eliminate seventy-five percent of diazinon use, or over eleven million pounds of diazinon annually.

For more information on this and other EPA actions, see their website at **http://www.epa.gov/pesticides/**. *Specific diazinon information can be found at* **http://www.epa.gov/pesticides/op/diazinon.htm**.

FEQL Looks Toward 2001

Advisory Board Met Nov. 2000

Scott McKinnie, FEQL Advisory Board Chair

The Food and Environmental Quality Laboratory (FEQL) Advisory Board met for the fourth time at the Washington State University (WSU) Tri-Cities campus on November 21, 2000. I opened the meeting, then invited WSU administrators to address the group. Washington State University (WSU) College of Agriculture and Home Economics Dean James Zuiches outlined the university's current budgetary situation. Department Chair of Entomology, John Brown reminded board members of suggestions they had made for the FEQL faculty members at their last meeting (see "FEQL Advisory Board Prepares for 2000," *AENews* Issue No. 165, Jan. 2000).

Next, we addressed board structure and policies, including terms of office. Marilyn Perkins and I will retain our current Vice Chair and Chair positions through June 30, 2001. In response to an Advisory Board request for more communication from FEQL members, Dr. Allan Felsot volunteered to coordinate a quarterly e-mail update.

Dr. Catherine Daniels briefed the group on a proposal she had submitted for regional funding to support a state Pest Management Center (PMC) within the existing Pesticide Information Center of the FEQL. The board agreed to serve as a stakeholder advisory committee for the new PMC. The Advisory Board reviewed several crop profiles generated through the Pesticide Information Center (PIC) and complimented the effort.

Dr. Vincent Hebert introduced himself to the Advisory Board with an overview of his activities since joining the FEQL in July 2000. He emphasized the need to have the FEQL certified as a Good Laboratory Practices (GLP) facility and praised Doria Monter-Rogers for her willingness to serve as the on-site Quality Assurance Officer. Dr. Hebert briefed the group on several collaborative projects that he has initiated. He expressed the need for a liquid chromatograph linked to two successive mass spectrometers in order to succeed in analysis of newer more hydrophilic pesticides.

Dr. Douglas Walsh shared information he had collected on both beneficial and pestiferous insects found in riparian buffer zones. This was an area of research the Advisory Board had suggested FEQL personnel pursue. Dr. Walsh, the Washington State Liaison Representative for the nationwide Interregional Research Project #4 (IR-4), talked about IR-4 projects scheduled for completion by FEQL members this coming year.

Dr. Allan Felsot referred the Advisory Board to his articles published in the *Agrichemical and Environmental News* on buffer zones and on genetically modified organisms (GMOs). Dr. Felsot and WSU Tri-Cities Dean Larry James proposed that Dr. Felsot become more involved with undergraduate education on campus. Dr. Felsot stated his interest in working with the Columbia Basin College faculty to coordinate a General Agriculture degree through which students could emphasize one of several specific disciplines. His effort toward teaching would be rewarded by additional graduate research assistantships from the Agricultural Research Center, thereby allowing him to continue his toxicology research.

Sally O'Neal Coates presented an update on success of the FEQL's primary communication tool, the monthly *Agrichemical and Environmental News* newsletter.

Looking ahead toward other issues to be addressed by the Advisory Board and by FEQL, farm worker safety (specifically re-entry intervals, or REIs) and air quality (specifically as relating to the Americans with Disabilities Act) were identified as possible issues to explore. FEQL board and/or faculty members will either address these issues at future meetings or invite experts to speak to these topics at the spring meeting of the Advisory Board, which was scheduled for Tuesday, April 17, 2001.

*Scott McKinnie is Executive Director of Far West Agribusiness Association (**http://www.fwaa.org/**) and Chair of the FEQL Advisory Board. He can be reached at (509) 464-4886 or at **scott@fwaa.org**.*

Pest of the Month
Cluster Fly

Page 19
Agrichemical & Environmental News
Jan. 2001
No. 177

Jack Marlowe, President, Washington State Pest Control Association

Cluster fly is widely distributed throughout the United States. The fly enters structures in the fall seeking areas in which to overwinter. They often collect in attics, basements, wall voids, closets, or any dark, protected area. There, they gather in groups or clusters and enter a dormant state to wait out the cold weather months.

Description

Slightly larger than houseflies, cluster flies are a nonmetallic dark gray. They have no markings on the thorax and the thorax has a hairy appearance. The abdomen is dark gray with irregular lighter patches.

Life Cycle and Habits

Cluster flies lay their eggs in soil. When the larvae hatch, they are parasitic specifically on earthworms, making eradication difficult (see below). From late spring through early fall, the flies will produce about four generations.

Cluster flies do no damage per se, but can be a great annoyance when they become active in the spring. They can also be a problem on warmer days during the winter, when numbers of flies may break dormancy prematurely. As temperatures warm, the flies may emerge off and on for several weeks. They tend to congregate on windows in the sunniest rooms of the structure, and are often sluggish. While cluster flies are very adept at finding their way into a structure, they are not as capable when seeking to exit. This can sometimes result in hundreds of flies congregating in various rooms.

Control

Most flies of this size breed in garbage, carcasses, or other rotting organic matter. When breeding sites are eliminated (cleaned up), populations of these flies are quickly reduced. Not so with cluster flies. Due to the subterranean dietary preferences of the larvae, cluster flies are not eradicated through sanitation.

When cluster flies emerge in the spring, they will readily exit the structure if they can find an open, screenless window. If they congregate near a window that won't open, it is difficult to get them to move to another site. If you cannot get them to an open window, you can vacuum them up with a hose attachment on your vacuum cleaner. Remove the vacuum bag and discard it in an outside trash container afterward. If a small number of flies are present, insect glue traps can be taped in the corners of the affected windows and discarded after the insects are caught.

To prevent a cluster fly problem, try to eliminate their entrance paths. Check the structure's exterior, concentrating on the side of the house that gets the most sun. Look for and replace missing vent screens. Windows and doors that do not shut completely can be made more secure with weather stripping. Seal cracks along soffits, eaves, and siding, and secure loose boards. Such inspection and exclusion work can be time-consuming, but is generally inexpensive. And it beats "herding flies" after a big indoor emergence!

*Jack Marlowe is the owner of Eden Advanced Pest Technologies (**http://edenpest.com**) and current President of Washington State Pest Control Association. He can be reached at edenapt@olywa.net or (800) 401-9935.*

Cluster fly illustration courtesy of Penn State University Department of Entomology, http://BeeLab.cas.psu.edu. © Scott Camanzine

Tolerance Information

Chemical (type)	Federal Register	Tolerance (ppm)	Commodity (raw)	Time-Limited		
				Yes/No	New/Extension	Expiration Date
sulfentrazone (herbicide)	11/9/00 pg. 67272	0.10	horseradish	Yes	New	12/31/02
Comment: This time-limited tolerance is being established in response to EPA granting a Section 18 for the use of sulfentrazone to control broadleaf weeds in Illinois horseradish.						
pyriproxyfen (insecticide)	11/15/00 pg. 68912	0.10	stone fruit	Yes	Extension	12/31/02
Comment: With this action EPA is re-establishing this tolerance. This is in response to EPA again granting a Section 18 emergency exemption for the use of pyriproxyfen to control San Jose Scale in California stone fruit.						
fenhexamid (fungicide)	11/21/00 pg. 69876	15.00	pear	Yes	New	12/31/02
Comment: This time-limited tolerance is being issued in response to EPA granting a Section 18 for the use of fenhexamid for post-harvest use to control *Botrytis* on California pears.						

Do You Value *AENews?*

Big changes may be in the works for *Agrichemical and Environmental News.* To keep this newsletter strong and vital, we need input from our readers.

1. Are we covering the agrichemical and environmental issues you would like to see addressed? Are we leaving anything important out or covering other topics too much? Let us know by dropping a note to Managing Editor Catherine Daniels at **cdaniels@tricity.wsu.edu** or at the address below.

2. Your financial support is crucial. Due to recent federal funding cuts, we can no longer afford to provide complimentary subscriptions. This is probably the last year *AENews* will be such a bargain—only $15. If you have not sent a check for 2001, please send one today to **AENews Subscriptions, Pesticide Information Center, Washington State University, 2710 University Drive, Richland, WA 99352**.

WE NEED YOUR SUPPORT. CONTACT US TODAY.

Federal Register Excerpts

Compiled by Jane M. Thomas, Pesticide Notification Network Coordinator, WSU

In the November 17 Federal Register, EPA announced that companies that hold the pesticide registrations for chlorpyrifos enduse pesticide products have asked EPA to cancel or amend their registrations. These requests for voluntary cancellation and amendment are the result of a memorandum of agreement signed by EPA and the basic manufacturers of chlorpyrifos on June 7, 2000. These cancellations and requests for amendment are parallel to those announced in the September 20 Federal Register except that the first covered requests from basic chlorpyrifos manufacturers while this notification covers requests by the registrants who are customers of these basic chlorpyrifos manufacturers. (Page 69518) (For a more detailed discussion of this action see PNN notification 2000-283 on the PNN web page www.pnn.wsu.edu.)

In the November 22 Federal Register EPA announced that the draft document "Guidance for Pesticide Registrants on Bee Precautionary Labeling" is now available. The document is intended to provide guidance to registrants and others regarding EPA's policy for bee labeling statements for pesticide products that are toxic to bees. This document is available electronically at the following URL: http://www.epa.gov/pesticides/ under Open Comment Periods: Draft PR Notices. (Page 70350)

In the November 22 Federal Register, EPA announced that it was seeking comment on a draft Pesticide Registration (PR) Notice titled "Elimination of Phenol Resistance Testing for Antimicrobial Disinfectant and Sanitizer Pesticides." This draft notice provides guidance to registrants concerning the discontinuation of phenol resistance testing as a part of efficacy testing for antimicrobial disinfectants and sanitizers. An electronic copy of this draft PR notice is available on EPA's web page at: http://www.epa.gov/pesticides. (Page 70352)

PNN Update

The Pesticide Notification Network (PNN) is operated by WSU's Pesticide Information Center (PIC) for the Washington State Commission on Pesticide Registration. The system is designed to distribute pesticide registration and label change information to groups representing Washington's pesticide users.

PNN notifications can be viewed on our web page. Access the PNN page via the Pesticide Information Center On-Line (PICOL) Main Page, **http://picol.cahe.wsu.edu/,** or directly, at **http://www.pnn.wsu.edu/**.

Should you have questions about the PNN or information on our PICOL page, e-mail PNN Coordinator Jane M. Thomas at **jmthomas@tricity.wsu.edu** or contact Pesticide Information Center Manager Catherine Daniels at **cdaniels@tricity.wsu.edu** or (509) 372-7495.