



Environmental Toxicology Newsletter

"Published Occasionally at Irregular Intervals"

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Vol. 20 No. 5 -- September 2000

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Children Exposed Biomonitoring Can Provide a Baseline

A 1993 report by the National Academy of Sciences suggested that pesticide safety thresholds should be lower for children than for adults --up to 10 times lower-- due to children's generally higher vulnerability to the effects of certain compounds. In a controversial response to this report, the U.S. Environmental Protection Agency (EPA) determined that, as part of its implementation of the Food Quality Protection Act (FQPA), which mandates evaluation of aggregate exposure to pesticides and cumulative health risk, **it must reassess nearly 10,000 uses for hundreds of pesticides.**

Among the **first pesticides to be reassessed are the widely used organophosphate compounds.** Gauging children's aggregate exposure to those pesticides and their cumulative risk is a tremendous task. Richard Fenske and colleagues at Seattle's University of Washington School of Public Health and Community Medicine tested biological monitoring as a means of meeting this challenge. They found that such biomonitoring can indeed be useful in performing this task, and may also be helpful in setting baselines for regulatory use.

Current methods for assessing aggregate exposure rely on complex modeling and measurement of environmental concentrations, such as pesticide concentrations in food, drinking water, and household dust. Using models, researchers then factor in behavioral information such as food or water intake, or contact with dust. Conducting such assessments for each exposure route and pathway becomes very complex and uncertain. Fenske and colleagues maintain that biological monitoring (for example, a series of urine analysis measurements to detect pesticide metabolites) accounts for all routes and pathways of exposure with a single measurement or a series of measurements. Organophosphate

pesticides, which are metabolized relatively quickly and excreted in the urine, are prime candidates for biological monitoring.

The researchers obtained two urine samples each from 109 children (up to six years old) around Wenatchee, Washington, during the May-July period when apple orchards in the area are sprayed with organophosphate pesticides. Ninety-one "case" children came from households with adults engaged in field-based agriculture, and 18 "control" children came from households with no field-based workers. One child from each household (62 cases, 14 controls) was then selected for statistical analysis.

The researchers measured metabolite concentrations using gas chromatography and found significant amounts of two organophosphate compounds, dimethyl thiophosphate and dimethyl dithiophosphate. Based on metabolite concentrations, they were able to back-calculate how much pesticide each child was exposed to. An average of the pesticide metabolites in each child's two samples provided a "spray season dose," considered a best estimate of daily exposure. Metabolite concentrations were then converted to dose values.

The researchers then compared the children's dose estimates to reference dose values (benchmark concentrations at which a pesticide can be chronically ingested with no observable adverse effects) developed by the EPA and the World Health Organization for azinphos-methyl and phosmet, the primary organophosphate pesticides then used in the region. For azinphos-methyl, 56% of the case children's doses and 44% of the control children's doses exceeded the EPA's reference dose values. For phosmet, 9% of the case children's doses and none of the control children's doses exceeded the reference dose value. If the current EPA reference doses for the two pesticides were increased by 10-fold, as recommended by the FQPA to provide a child safety factor for certain pesticide risk assessments, those limits would have been exceeded by most of the children with detectable metabolites in this study. None of the dose estimates exceeded the empirically derived no-observable-adverse-effect levels for these compounds.

The authors conclude that organophosphate pesticide exposures for children in agricultural communities fall into a range that merits regulatory concern. They further conclude that biological monitoring can help regulators evaluate aggregate exposure and cumulative risk, as mandated by the FQPA. Biomonitoring surveys of selected child populations at an early stage of FQPA implementation could provide important baseline data for the big task of evaluating the law's effectiveness.

REF: *Environmental Health Perspectives*, 108(6), June 2000.



X-Rays and X Chromosomes The Leukemia Risk for Girls and Boys

Parents and health care practitioners alike cringe at the mere thought of exposing children to agents associated with cancer. For this reason, the medical world has traditionally shied away from administering prenatal X-rays, long known to increase the risk of childhood leukemia. But little research has examined the effects of diagnostic X-rays after birth, which are commonly prescribed by doctors. A team of Montreal researchers took a closer look at the underlying interactions between genes and exposure to X-rays and concludes that **the practice of X-raying youngsters may be putting them at increased risk**, as well.

The team, led by McGill University medical professor Claire Infante-Rivard, first explored the link between childhood X-rays and the incidence of leukemia by analyzing data collected from telephone interviews with the parents of nearly 1,000 children in Quebec, half with documented cases of leukemia. Typically, the children had received mainly bone X-rays from ages five to nine. The team found that children who had received two or more X-rays after birth were 1.6 times as likely to develop leukemia as children receiving no X-rays. The effect was inexplicably more marked among girls: those exposed to two or more X-rays more than doubled their risk of leukemia, the team reports.

The researchers probed the link further. In the first-ever effort to describe gene-environment interactions in childhood leukemia, the team examined whether inherited genetic variations, or polymorphisms, influence susceptibility to the disease. Specifically, the team looked at differences in several DNA repair genes among a subgroup of roughly 130 children who were exposed to diagnostic X-rays and whose blood had been previously genotyped. They focused on four polymorphisms recently identified in three DNA repair genes.

The team found that these polymorphisms produced effects common to many gene variations; that is, they modulated the risk of children developing leukemia in a manner characteristic of polymorphisms, sometimes increasing the risk, sometimes decreasing it. Moreover, they found that the risks do not necessarily increase with higher exposures to X-rays; a girl with a different mutation on a different repair gene, for instance, is actually significantly protected against leukemia upon greater exposure to X-rays.

The team also determined that some polymorphisms in DNA repair genes modify risk in girls, while others modify risk in boys. Consider this: among girls, carrying a specific mutation on a repair gene and being exposed to two or more X-rays results in a risk of developing leukemia that is over 6.5 times greater than the product of the risk from the mutation and the X-ray exposure. The increased risk reveals a synergistic effect between the polymorphism and exposure to X-rays. Meanwhile, a boy with the same mutation and exposure actually has a reduced risk of leukemia.

Overall, the study strongly suggests that the effects of diagnostic radiation after birth may be more striking among girls. And for now, the researchers can't offer a tidy explanation for the gender differences. Infante-Rivard suggests, based on the new findings, that perhaps more caution should be exercised in prescribing X-rays for both sexes and more research should be conducted on the actual dosages administered. The study authors also call for more study of polymorphisms in DNA repair genes.

REF: *Environmental Health Perspectives*, 108(6), June 2000.



Legionnaires' Disease Associated With Potting Soil --- California, Oregon, and Washington, May--June 2000

Since Legionnaires' Disease (LD) was first reported in 1976, outbreaks have been associated with airborne transmission of *Legionella* bacteria through cooling towers, showers, and other aerosolizing devices (*even hot-tubs*). However, most LD cases are sporadic, and the source and mode of infection in many cases are unknown. Infections with one species, *Legionella longbeachae*, have been associated with gardening and use of potting soil in Australia and Japan. This report summarizes the findings of LD investigations in California, Oregon, and Washington, that suggest that transmission from potting soil has occurred for the first time in the United States.

On June 13, 2000, Centers for Disease Control (CDC) was alerted by a county health official in Washington of *L. longbeachae* infection in a 46-year-old woman who had been hospitalized with pneumonia. The patient reported that she had been potting plants during the 10 days before her symptoms began in May. An isolate from the patient's sputum was sent to CDC for species confirmation, and two samples of potting soil and one of compost from the original packages obtained from the patient's residence were sent for analysis. *L. longbeachae* was isolated from one potting soil sample. The compost contained other *Legionella* species but not *longbeachae*.

In May, two *L. longbeachae* isolates had been received at CDC from bronchial wash samples taken from both a 77-year-old Oregon woman and a 45-year-old California man who were both diagnosed with legionellosis. The California patient died and his house was cleaned before an investigation could be undertaken. State and local health

officials determined that the Oregon patient had been potting plants using commercial potting soil mixtures and had been working in a home garden during the 10 days before her symptoms began in April. Two potting soil samples taken from her residence were tested for *Legionella* at CDC; one was positive for *L. longbeachae*. Isolates of *L. longbeachae* from the patients and soils will be compared using amplified fragment length polymorphism typing.

Editorial Note: Soil surveys for *Legionella* have not been conducted in the United States; however, in a soil survey in Australia, 33 (73%) of 45 potting soil samples tested positive for *Legionella*; 26 (79%) of the 33 contained *longbeachae*. Nineteen (100%) soil samples in Europe and the United Kingdom were negative for *L. longbeachae*. A survey of 17 soil samples in Japan in 1998 yielded 31 different strains of *Legionella*; eight of the 17 samples (47%) contained *L. longbeachae*.

REF: *Morbidity and Mortality Weekly Report*, 49(34);777-8, September 01, 2000.



Foodborne Botulism From Eating Home-Pickled Eggs --- Illinois, 1997

On November 23, 1997, a previously healthy 68-year-old man became nauseated, vomited, and complained of abdominal pain. During the next 2 days, he developed diplopia, dysarthria, and respiratory impairment, necessitating hospitalization and mechanical ventilation. Physical examination confirmed multiple cranial nerve abnormalities, including extraocular motor palsy and diffuse flaccid paralysis. Possible botulism was diagnosed, and a one-vial dose of trivalent (types A, B, and E) antitoxin was administered. A sample of the patient's serum collected before antitoxin administration demonstrated the presence of type B botulinum toxin. A food history revealed no exposures to home-canned products; however, the patient had eaten pickled eggs that he had prepared 7 days before onset of illness; gastrointestinal symptoms began 12 hours after ingestion. The patient recovered after prolonged supportive care.

The pickled eggs were prepared using a recipe that consisted of hard-boiled eggs, commercially prepared beets and hot peppers, and vinegar. The intact hard-boiled eggs were peeled and punctured with toothpicks then combined with the other ingredients in a glass jar that closed with a metal screw-on lid. The mixture was stored at room temperature and occasionally was exposed to sunlight.

Cultures revealed *Clostridium botulinum* type B, and type B toxin was detected in samples of the pickled egg mixture at CDC's National Botulism Surveillance and Reference Laboratory. *C. botulinum* was cultured from the pickling liquid, beets, and egg yolk. The concentration of preformed type B toxin was **1000 times greater in the egg yolks** than in the pickling liquid and was undetected in the beets. Peppers from the original commercial container contained no detectable toxin, and bacterial cultures of the peppers did not yield *C. botulinum*. Beets from the original commercial containers were not available. The pH of the pickling liquid was 3.5 (i.e., adequate to prevent *C. botulinum* germination and toxin formation. **However, the pH of the egg yolk was not determined [normal egg yolk pH: 6.8]).**

Editorial Note: Botulism is a paralytic illness caused by the neurotoxin produced by the bacterium *C. botulinum*. Paralysis first affects the cranial nerves, then the skeletal muscles; untreated intoxications can lead to dense flaccid paralysis, respiratory failure, and death.

Although rare and sporadic, foodborne botulism is a persistent cause of morbidity and mortality in the United States. In 1997, an annual survey of state epidemiologists and directors of state public health laboratories identified 24 cases of foodborne botulism with one associated death. During 1989-1998, a median of 23 cases (range: 17-42 cases) of foodborne botulism was reported each year with a median of one death (range: 0-2 deaths).

C. botulinum spores are ubiquitous. Safe food preservation methods destroy spores or inhibit their germination and

growth. Conditions that promote germination and growth of *C. botulinum* spores include absence of oxygen (anaerobic conditions), low acidity (pH >4.6), temperatures >39 F [4 C]), and high moisture content. Most foodborne botulism cases that occur in the United States are the result of improperly home-canned foods. **This is the first reported case of botulism related to eating pickled eggs.** The amount of toxin detected in the recovered egg yolk suggested that bacterial growth was concentrated in that portion of the egg. Intact eggs that have been hard-boiled should be free of bacteria or spores. **Pricking cooked eggs may introduce *C. botulinum* spores into the yolk.** Portions of the yolk that remained anaerobic and inadequately pickled (i.e., not acidified to pH <4.6) may have allowed *C. botulinum* spores to germinate, grow, and form toxin. Setting the pickling jar in sunlight provided warmth that facilitated bacterial growth and toxin production.

To reduce the risk for botulism when pickling, food items should be washed and cooked adequately, and utensils, containers, and other surfaces in contact with food, including cutting boards and hands, should be cleaned thoroughly with soap and warm water. Containers (e.g., jars and lids) in which pickling will occur should be sterilized (e.g., placed in boiling water for the prescribed period published in the container instructions). Adequate acidification to a pH <4.6 is essential. Refrigeration at 39 F (4 C) during pickling is advisable, especially in foods that may be acidified inadequately such as whole eggs. Once opened, any canned or pickled food should be refrigerated. **Pricking, poking holes, or otherwise handling whole eggs in a manner that might allow spores or bacteria into the yolk should be avoided.**

REF: *Morbidity and Mortality Weekly Report*, 49(34);778-780, September 01, 2000.



Chlorpyrifos Redux (It Ain't Over 'Til the EPA Sings)

If you've been following the latest protest fad--anti-corporate globalism, pro-butterflies and turtles--then you might have the impression that our sovereignty has been taken over by Monsanto, Dow, Microsoft, or whatever your favorite corporation happens to be. But the June 8, 2000, release of the EPA's revised risk assessment of chlorpyrifos and risk mitigation plans shows that the government, not the corporations, is firmly in charge.

Contrary to some press reports, EPA did not officially ban chlorpyrifos. The New York Times expressed EPA's decisions best--an accord was reached with the registrants. In a nutshell, the EPA said chlorpyrifos use around homes is too risky, but not risky enough to declare it an imminent hazard and immediately suspend it, as the FQPA would allow it to do. Rather, the agency negotiated with the principal registrant, Dow AgroSciences (DAS), and the other minor manufacturers a phase-out of residential uses and some minor proscriptions for a few agricultural commodities (apples, grapes, tomatoes).

REF: *Ag & Env News*, Issue 171, July 2000. <http://www2.tricity.wsu.edu/aenews/>



Lack of eight key micronutrients explains higher cancer rate

Researchers believe the higher incidence of cancer among Americans who eat the fewest fruits and vegetables is related to a lack of eight key micronutrients. The quarter of Americans consuming the least amount of fruits and

vegetables has about twice the rate of most cancers as the 25% of individuals with the highest intake, according to Bruce Ames, director of the National Institute of Environmental Health Sciences Center at the University of California-Berkeley. A low intake of the vitamins and minerals seems to damage DNA as if it had been exposed to radiation, he said.

In remarks to a conference on dietary imbalances and the health of the poor June 12-13 in Oakland, Calif., Ames said half of the American population may have low intake (defined as less than 50% of the Recommended Dietary Allowance or RDA) of at least one of the following eight micronutrients: vitamins B12, B6, C and E, folic acid, niacin and iron or zinc. To deal with deficiencies of vitamins and minerals, Ames suggested "tuning up" the metabolism. "A multivitamin pill - which is sold for as little as two cents - is good insurance in bringing this about, and will particularly help the poor," Ames said.

REF: *Food Chemical News Daily*, 3(1), June 29, 2000.



DPR to Register Structural Pest Control Devices

The California Department of Pesticide Regulation will require manufacturers and sellers of devices designed to combat wood-destroying structural pests to show the products are safe and effective for use in California. DPR has begun accepting applications to register "structural pest control devices" marketed to control wood-destroying insects. Such devices typically utilize heat, microwave, or electrical treatments. Their sale and use has been largely unregulated in California and most other states.

DPR registration will require applicants to provide efficacy and safety data to protect the public, workers, and the environment. Mandated by 1998 legislation, registration requirements take effect on July 1, 2001. The law gives DPR authority to seek civil penalties of up to \$10,000 per violation for any unregistered device sold, possessed, or used after that date. Registration applies to devices intended to control termites, carpenter ants, powder post beetles and other wood-destroying pests. Exempted are devices that target decay-causing fungi, cockroaches and other household pests, and vertebrate pests such as mice and rats.

Registration application forms may be downloaded from DPR's Web site at www.cdpr.ca.gov/docs/registration/regmenu.htm. For more information, contact Liz Pelham, program coordinator, at (916) 323-5149 or e-mail: lpelham@cdpr.ca.gov.

Termites are the nation's most destructive wood pests. In California, several hundred thousand treatments are directed against drywood termites annually. About 70 percent involve chemical spot treatments for small infestations, 20 percent are whole-structure fumigant treatments, and 10 percent use non-chemical methods, according to the University of California Integrated Pest Management Project.

REF: Department of Pesticide Regulation Press Release, <http://www.cdpr.ca.gov>, August 3, 2000 (00-18).



Malathion Risks Generally Acceptable

"Malathion presents very few unacceptable risks to human health," EPA determined in its preliminary evaluation of the insecticide. Some of the most anticipated findings were those relating malathion's use for mosquito control. This assessment was done separately from the others. EPA's Office of Pesticide Programs Health Effects Division (HED) estimated that the risks from aerial and terrestrial application are well below the agency's threshold of concern.

Dietary exposures to malathion are not a concern to EPA and the agency eliminated the Food Quality Protection Act 10x safety factor because the toxicological data base for malathion is complete. Studies have not demonstrated reproductive or fetal effects. Neither malathion nor malaoxon exposures through drinking water are considered a concern by HED because "malathion shows little persistence in water" and although "limited fate data are available on malaoxon, the parent and its degradate are expected to have similar chemical properties." In assessing residential exposures, HED identified five exposure scenarios for residential handlers. One stood out as a concern: mixing/loading/applying the liquid formulation with a low-pressure hand wand.

According to the risk assessment, respiratory exposures to malathion by aerial or terrestrial sprays for mosquito control do not present any risks of concern.

HED determined that there were two risks of concern for occupational exposure: applying malathion with an airblast sprayer to fruits and nuts, and mixing/loading liquids for chemigation and aerial application. These risks may be moderated because the risk estimate is close to the acceptable risk index.

HED determined that post-applications risk "is a concern for re-entry on the same day as application (12 hours following treatment) for all exposure scenarios except for non-harvesting activities associated with crops for which there is potential for a low degree of contact. Restricted Entry Intervals where margins of exposure are not of concern for workers are estimated to range from one to six days. The current re-entry interval is 12 hours.

REF: *Chemically Speaking*, July 2000.



Revisions Proposed to Household Pesticide Disposal Guidance

EPA announced proposed revisions to its 17-year-old guidance on the disposal of household pesticides. The existing guidance requires labels to say, "Securely wrap original container in several layers of newspaper and discard in trash." The language allows a Resource Conservation and Recovery Act exemption for household pesticide containers, which would otherwise be regulated as hazardous waste. EPA learned in its Consumer Labeling Initiative surveys that the numerous state and municipal disposal rules were confusing consumers and complicating outreach efforts.

In addition to proposed language to replace wrapping instructions, EPA is proposing the addition of recycling statements to the disposal language. Federal Trade Commission guidance must be referenced for recycling statements. Proposed language for aerosol products say:

- Replace cap. Do Not Incinerate or Puncture!
- If empty: Place in trash (or insert recycling statement here).
- If partly filled: Call your local solid waste agency or (1-800-CLEANUP or an equivalent organization for disposal instructions. Unless otherwise instructed, place in trash.

The language for non-aerosol products would say:

- If empty: Do not reuse this container. Do not rinse unless required for recycling. Place in trash (or insert recycling statement here).
- If partly filled: Call your local solid waste agency or (1-800-CLEANUP or an equivalent organization for disposal instructions. Unless otherwise instructed, place in trash. Never pour unused product down the drain or on the ground.

According to the proposed new guidance, the instruction to "call your local solid waste agency" has been proposed because "different types of products may require different types of disposal." A toll-free number or Web site can "help consumers locate their local authorities conveniently."

Previously, to determine if products qualified as household pesticides, the registrants relied, in part, on EPA published guidance (PR Notice 84-1). This notice defined them as "those marketed in containers of 1 gallon or less for liquids (except for bleach products) and 5 pounds or less for dryproducts (except for lawn products)." These quantitative limits "are no longer representative of the residential/household market," say EPA. Products will be regarded as household if that is their stated purpose; if they are not labeled with statements to the opposite effect; and if they are readily available. These proposed revisions do not apply to antimicrobials. (*Pesticide and Toxic Chemical News*, 28, 35.)

REF: *Chemically Speaking*, July 2000.



Scientists Clear Preservative Despite Concerns

Despite some concerns about the safety of cured meats, a California scientific panel recently voted seven to one against adding sodium nitrite to California's Proposition 65 list of reproductive toxicants. "There seems to be a correlation with cured meat," said Carl Keen of the University of California at Davis. But there's no convincing evidence that sodium nitrite consumed by women during pregnancy is linked to subsequent childhood cancers, Keen said.

Sodium nitrite is used as a preservative and colorant, and to prevent contaminants such as botulism in a variety of meat products such as hot dogs, ham, bacon, bologna, and salami. According to scientists with California's Office of Environmental Health Hazard Assessment (OEHHA), 4 epidemiological studies showed a statistically significant increased risk of brain tumors in children whose mothers consumed cured meats during pregnancy. Likewise, four of six epidemiological studies showed statistically significant risks linking maternal hot dog consumption with childhood tumors. The impact appeared to be mitigated by vitamin use during pregnancy.

A consultant to the American Meat Institute and Grocery Manufacturers of American said the epidemiological findings were inconsistent and, regardless, concerned cured meats and not sodium nitrite. The consultant further stated that a handful of animal studies showing positive results had numerous flaws, such as inadequate numbers of test animals, the absence of multiple doses and inappropriate control animals. A two-year rodent study of sodium nitrite conducted by the National Toxicology Program found no significant health effects or reproductive toxicity.

An evaluation by the dean of the University of California School of Public Health stated that none of the studies provide a direct measure of dietary sodium nitrite exposure to mothers and that the available epidemiological evidence does not support a conclusion that maternal exposure to sodium nitrite causes brain tumors in children. Further, listing sodium nitrate on the Proposition 65 list may be detrimental if safe alternatives for preservation of meats are not readily available.

The regulatory standard for a Proposition 65 listing is "clearly shown through scientifically valid testing according to generally accepted principles to cause reproductive toxicity."

REF: *Food Chemical News*, 42(17), June 12, 2000.



‡ Toxicology Tidbits ‡

Mid-Life Tofu Consumption Associated With Mental Decline

Eating large amounts of tofu in mid-life may be associated with mental deterioration in old age, according to the Hawaii Center for Health Research. An analysis of data from the Honolulu Heart Program found that men who ate the most tofu during their mid-40s to mid-60s showed the most signs of mental deterioration in their mid-70s to early 90s. The program began tracing the health of 8,000 Japanese-American men in 1965. Researchers said that both men and women eating tofu two or more times a week were up to twice as likely to show some signs of impaired mental function later in life than those who rarely ate tofu. The proposed link between eating tofu and decline in brain function is the isoflavones, chemicals in soy that affect an enzyme in the body that may block changes in the brain related to learning. (*Journal of the American College of Nutrition*, April 2000)

REF: *FDA Consumer magazine*, July-August 2000.



Mortality among the Residents of the Three Mile Island Accident Area: 1979-1992

The largest U.S. population exposed to low-level radioactivity released by an accident at a nuclear power plant is composed of residents near the Three Mile Island (TMI) Plant on 28 March 1979. This paper (a collaboration of The University of Pittsburgh and the Pennsylvania Department of Health) reports on the mortality experience of the 32,135 members in this cohort for 1979-1992. We analyzed standardized mortality ratios (SMRs) using a local comparison population and performed relative risk regression modeling to assess overall mortality and specific cancer risks by confounding factors and radiation-related exposure variables. Total mortality was significantly elevated for both men and women (SMRs = 109 and 118, respectively). All heart disease accounted for 43.3% of total deaths and demonstrated elevated SMRs for heart disease of 113 and 130 for men and women, respectively; however, when controlling for confounders and natural background radiation, these elevations in heart disease were no longer evident. Overall cancer mortality was similar in this cohort as compared to the local population (male SMR = 100; female SMR = 101). In the relative risk modeling, there was a significant effect for all lymphatic and hematopoietic tissue in males in relation to natural background exposure ($p = 0.04$). However, no trend was noted. We found a significant linear trend for female breast cancer risk in relation to increasing levels of TMI-related likely γ -exposure ($p = 0.02$). Although such a relationship has been noted in other investigations, emissions from the TMI incident were significantly lower than in other documented studies. Therefore, **it is unlikely that this observed increase is related to radiation exposure on the day of the accident.** The mortality surveillance of this cohort does not provide consistent evidence that radioactivity released during the TMI accident has a significant impact on the mortality experience of this cohort to date. However, continued follow-up of these individuals will provide a more comprehensive description of the morbidity and mortality experience of the cohort.

REF: *Environmental Health Perspectives*, 108(6), June 2000.



Regulating Herbicide Tolerant Plants

One of the most common complaints about transgenic crop technology stems from the perception that little safety testing was done prior to commercial release of the engineered cultivars. In fact, the risks of genetically engineered herbicide tolerance were assessed by three federal regulatory agencies, APHIS (USDA Animal and Plant Health Inspection Service), FDA (Food & Drug Administration), and EPA (Environmental Protection Agency). Although APHIS, FDA, and EPA consult with one another, each plays a distinct role in regulating transgenic crops and other biotechnology products.

For the entire article see the August 2000 issue of *Agrichemical & Environmental News* at <http://www2.tricity.wsu.edu/aenews/>



Herbicide Tolerant Genes, Part 1: Squaring Up Roundup Ready Crops

Here's a novel idea. Let's use a weed control technology that is very likely to eliminate the ubiquitous detection of certain herbicides in water all over the world. No, I'm not suggesting we should start heavily mulching the 140-million-plus acres of soybean and corn in the United States. (After all, those two commodities are responsible for the vast majority of pesticide detections found in ground and surface water.) What I had in mind was the use of a phytotoxic amino acid that binds to soil and therefore doesn't leach nor is it subject to runoff under proper soil conservation practices. Consumers have been buying formulated versions of the chemical for nearly two decades, safely using it to control weeds alongside their driveways and sidewalks, or to prepare vegetated areas for new plantings.

The only problem with this seemingly miraculous product is that it kills just about any plant onto which it is directly sprayed. Thus, until recently, this synthetic amino acid, known as glyphosate (N-phosphono-methyl glycine) has had limited utility in agricultural production. And then along came genetic engineering. In just the last five years, Monsanto has commercialized soybeans, corn, cotton, and rape (canola) genetically engineered to resist the toxic effects of glyphosate. Monsanto trademarked these transgenic cultivars as Roundup Ready (RR), in reference to their commercial formulation of glyphosate.

So everyone should be cheering about the decreased numbers of pesticide applications (or at least the potential to decrease them) on the large U.S. acreages of soybeans, corn, cotton and canola, right? Well, if you read any newspaper today it's clear that everyone is not cheering. In fact, as with all transgenic technology, RR crops have not escaped the wrath of advocates who seem hell bent to trash biotechnology in total rather than judge each development on its own merits or faults. So, in keeping with the National Academy of Sciences recommendation that each transgenic crop involving traits useful for protection from pests be judged individually, I will review the biochemistry of glyphosate tolerance and address the validity of critics' concerns.

To see this entire article authored by Dr. Allen Felsot in *Agricultural and Environmental News* go to

<http://www2.tricity.wsu.edu/aenews/> and click on the September 2000 issue.



Policy Issues Related to the Food Quality Protection Act

The EPA is announcing the availability of the revised version of the pesticide science policy document entitled "Available EPA Information on Assessing Exposure to Pesticides in Food--A User's Guide." This notice is the nineteenth in a series concerning science policy documents related to the Food Quality Protection Act of 1996 and developed through the Tolerance Reassessment Advisory Committee.

The purpose of this "User's Guide" is to provide the reader with a comprehensive discussion and listing of EPA, USDA, and Food and Drug Administration (FDA) guidance, policy documents, and databases that provide detailed, specific "how-to" information and/or data on assessing exposure to pesticides from the foods that we eat. To put this exposure information in context, this guide first provides a basic overview of risk assessment for exposure resulting from pesticide residues in food.

You may obtain electronic copies of this document, the science policy documents, and certain other related documents that might be available from the Office of Pesticide Programs' Home Page at <http://www.epa.gov/pesticides/>. On the Office of Pesticide Programs' Home Page select "FQPA" and then look up the entry for this document under "Science Policies." You can also go directly to the listings at the EPA Home Page at <http://www.epa.gov>. On the Home Page select "Laws and Regulations" and then look up the entry to this document under "Federal Register--Environmental Documents." You can go directly to the Federal Register listings at <http://www.epa.gov/fedrgstr/>.

REF: *Federal Register*, 65(134), July 12, 2000.



Human deaths from new variant Creutzfeldt-Jakob disease rising in U.K.

Deaths in the U.K. from new variant Creutzfeldt-Jakob disease (nvCJD), a transmissible spongiform encephalopathy linked to mad cow disease, have been rising by one-third each year since the phenomenon was detected in 1995, according to British scientists.

In a letter published in the Aug. 4 issue of *The Lancet*, the medical weekly journal, Rob Will and colleagues with the CJD Surveillance Unit said the incidence of nvCJD had been increasing by an average of 23% each year since 1994, and deaths from the disease had risen by 33% each year since 1995. "The absolute number of cases in the U.K. is still low, but such an increase should be a matter of concern," they said.

As of June 30, some 75 individuals with nvCJD had been identified by the surveillance unit, 69 of whom had died. Some 59 cases had been confirmed by post-mortem examinations of brain tissue. The other 16 individuals, six of whom were still alive, are classified as probable nvCJD.

REF: *Food Chemical News Daily*, 3(27), August 7, 2000.



EPA apologizes to pest control officials for lack of consultation over chlorpyrifos

EPA has apologized to the Association of Structural Pest Control Regulatory Officials (ASPCRO) for not notifying the group before taking regulatory action against the pesticide chlorpyrifos earlier this summer. In an Aug. 3 letter to the organization, agency official Susan Wayland assured the organization the agency would "make every effort to ensure that ASPCRO is advised of potential actions that may affect structural pest control." EPA angered members of the group in June when it limited termiticide uses of chlorpyrifos to .5% solutions and to "spot treatment" for existing structures, ostensibly without their consultation.

In a June 23 letter to Administrator Carol Browner, ASPCRO said a .5% solution could not guarantee 100% control of pests for five years, and had been shown in studies to provide only three to four years of protection in states with heavy infestations. Use rate concentrations of chlorpyrifos had previously been set at .75%.

The agency's Pesticide Regulation Notice 96-7 says the "registration of a product demonstrating less than five years of efficacy for control of termites is generally not appropriate from a safety or efficacy standpoint," according to ASPCRO. The notice also says EPA will "ensure coordination" with ASPCRO before any significant amendments to termiticide registrations.

The group has asked EPA to consider changing the use rate concentration back to .75% until the 2002 ban. Some state officials have threatened to disallow the pesticide's use if efficacy cannot be ensured.

REF: *Food Chemical News Daily*, 3(29), August 9, 2000.



New Grounds for Drinking Coffee

New information suggests that your morning cup of coffee may be a healthy part of a nutritious breakfast. Research by an international team of scientists published in the April 2000 issue of *Human and Ecological Risk Assessment* has shown that automatic drip coffee makers can remove up to 85% of both copper and lead in tap water. Team leader Herbert E. Allen, a professor of civil and environmental engineering at the University of Delaware in Newark, speculates that coffee grounds retain heavy metals through surface chelation, a chemical reaction in which metals form complexes with organic matter. After looking at ion exchange or adsorption as possible filtering mechanisms, Allen says that due to coffee's nature (coffee grounds having uncharged or negatively charged molecules) surface chelation most likely explains the large percentage of metals removed. Because dissolved heavy metals are positively charged, the metal ions bind strongly to the coffee, he says.

The results of the team's research suggest several reasons for the lead and copper removal. When increasingly stronger batches of coffee were brewed, an increase in metal removal was observed, probably because of the increased contact time between the coffee and the water as it seeped through a thicker bed of grounds. People who prefer stronger coffee may be enjoying a greater decrease of the metals, the team says, since the stronger the coffee is brewed, the more

metals may be removed. But after comparing the strongest batches and noting no additional removal of metals, they decided to continue the search for additional factors. They also found that coarse coffee grounds removed 73% of the copper and 79% of the lead. In comparison, finely ground coffee powder removed 90% of copper and 91% of lead, suggesting that the increased surface area of the smaller grounds enhances removal of the metals. A moister bed of coffee also increased how much metal was adsorbed, as demonstrated by collecting samples of the coffee as it passed through the coffee bed and comparing their metal concentrations to those of the finished pot. Allen says that sorption of the metals may also occur on interior surfaces of the coffee maker, paper filter, or glass carafe.

Although Allen says that the metal removal could actually be much higher worldwide for those who drink coffee, depending on cultural and personal tastes in coffee preparation, he says that the team's findings are important to current human exposure assessment estimates of copper and lead in tap water. Current estimates for metal exposure could be much higher than actual levels for people whose main tap water intake is through coffee.

REF: *Environmental Health Perspectives*, 108(7), July 2000.



Asbestos at Home

In February 2000, the U.S. EPA issued a warning for people to avoid disturbing any household insulation that may contain tremolite, a rare form of asbestos that easily penetrates lung tissue, where it can lead to severe dysfunction and cancer. Preliminary EPA testing found tremolite fibers in Zonolite brand household insulation, made from vermiculite ore (a volcanic mineral compound) as well as in other household and garden products. The EPA estimated in 1985 that the loose-fill insulation had been installed in 940,000 U.S. homes.

The EPA is concerned that consumers could be exposed to the dangerous mineral fibers when doing renovations, and is working to determine the extent of the threat to the public. A facility has been installed at the agency's Manchester, Washington, laboratory especially for testing vermiculite products. The EPA also advises that if insulation must be removed, those doing the removal should wear high-efficiency particle-arresting respirators, which prevent tremolite fibers from reaching the lungs.

REF: *Environmental Health Perspectives*, 108(7), July 2000.



Tobacco Dangers Start on the Farm

A study in the March 2000 issue of the *American Journal of Industrial Medicine* finds that commercialization and consolidation of tobacco farms may be causing a rise in green tobacco sickness, a form of acute nicotine poisoning that occurs after brushing against wet tobacco leaves. Wake Forest University School of Medicine epidemiologist Sara A. Quandt and colleagues found that 41% of the tobacco workers in the study (mostly Hispanic seasonal and migrant workers) reported symptoms of the illness at least once during the summer.

According to Quandt, Hispanic migrant workers are much shorter than the white and African-American workers who formerly worked family farms. This brings them in closer physical contact with tobacco plants, as does the closer planting of tobacco rows to increase output. "These workers are exposed to the risks of tobacco work for longer, more intensive periods of time than was ever the case for farming families," says Quandt.

The researchers state that green tobacco sickness is an environmental justice issue and call for studies of the economic impact of the disease and of the long-term effects of prolonged dermal exposure to tobacco plants, as well as for development of interventions to prevent or treat the illness.

REF: *Environmental Health Perspectives*, 108(7), July 2000.



Kids at Risk

Each of us grapples with managing the risks in our own lives. Parents face the added challenges and responsibilities of managing risks for their children, and empowering their children to make good decisions about risk. The following website offers suggestions to keep in mind when using information reported in the media to evaluate children's risks, put them in perspective, and make good choices.

For a list of over 50 things parents can do to reduce children's risks see: www.kidsrisk.harvard.edu

REF: *Risk in Perspective*, 8(4), April 2000.



Organic Guidelines: National List of Permitted Substances

The Organic Food Production Act of 1990, as amended, requires the Secretary of Agriculture to establish a National List of Allowed and Prohibited Substances which identifies the synthetic substances that may be used, and the nonsynthetic substances that cannot be used, in organic production and handling operations. This notice explains who can submit a petition, for what substances a petition can be submitted, and the information that should be included in a submitted petition. All submitted petitions will be evaluated by the USDA's National Organic Program (NOP) for completeness. Substances that are petitioned and under evaluation by the National Organic Standards Board (NOSB) will be announced on the NOP website at: <http://www.ams.usda.gov/nop>. Interested individuals or groups can provide information or commentary to the NOSB or NOP for any substance being evaluated by the NOSB.

For further information contact the NOP program manager at 202-720-3252; fax 202-690-3924; or email keith.jones@usda.gov.

REF: *Federal Register*, 65(135), July 13, 2000.



Website for the EPA's Office of Ground Water and Drinking Water

The website for the EPA's Office of Ground Water and Drinking Water <http://www.epa.gov/safewater/> provides substantial information on many aspects of water quality. The Topics page provides links to all conceivable water issues. The Drinking Water Standards Program page offers considerable information on priority rulemaking and regulatory infrastructure. The page for Underground Injection Control (UIC) explains what UIC is, how the wells are classified and how they are controlled. There is also substantial information on local drinking water and the health effects of contaminated water. Lastly, the page also offers a section for kids, with games, activities and experiments.

REF: Internet Newsbrief, September 8, 2000.



VETERINARY NOTES.....

FDA to regulate genetically engineered animals as animal drugs

FDA plans to regulate genetically engineered animals as animal drugs because they include articles other than food that are intended to affect the animal's structure or function, agency officials told Food Chemical News Daily. These articles are in the form of DNA constructs that are added to animals, said John Matheson, a senior regulatory review scientist at FDA's Center for Veterinary Medicine. When a DNA construct is added to a bacteria, eggs, or an animal after it is born, this fits the definition of an animal drug.

CVM is looking at the suitability of genetically engineered animals for their disposition to food or feed. It also is looking at environmental safety concerns, such as the possibility that disabled viruses developed from more than one species could infect people. Another concern is the possible escape of the genetically engineered animal into the wild. FDA plans to publish more specific guidance documents on the matter and also plans to hold workshops on the guidance documents early next year.

CVM's policy on genetically engineered animals, which will be consistent with that of other government agencies, is to look at the end product and not the process by which it was made.

REF: *Food Chemical News Daily*, 3(27), August 7, 2000.



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