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"Published Occasionally at Irregular Intervals"

~ Dr. Arthur L. Craigmill ~
Extension Toxicologist

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2002 Residues in Fresh Produce Summary of Results

About California's Pesticide Regulatory Program

California has the nation's most comprehensive program to regulate pesticide use. Under this program:

- A pesticide's safety and efficacy is evaluated before it is allowed to be used.
- All agricultural pesticide use must be reported.
- Pesticide specialists enforce restrictions intended to ensure the proper and safe use of pesticides.
- Domestic and imported produce is sampled and tested for pesticide residues.
- Annually, only a small fraction of the samples violated established standards.
- According to scientific experts, illegal residues rarely present a significant health risk.

Residue Monitoring

The Department of Pesticide Regulation's (DPR) Residue Monitoring Program is the most extensive state residue-monitoring program in the nation. It is the final check in an integrated network of programs designed to ensure the safe use of pesticides in California. In 2002 this program analyzed 5,759 samples of fresh produce. Samples were collected throughout the channels of trade: at seaports and other points of entry into the State, packing sites, wholesale, and retail outlets. The findings are consistent with those from previous years: there are few violative residues, and pesticide detections in produce are generally well below the allowable levels.

Marketplace Surveillance Program

The Marketplace Surveillance Program is a regulatory program designed to monitor compliance with pesticide laws and to help ensure that any detected pesticide residues are within the established tolerance levels. This program is also designed to provide data on pesticide dietary exposure. This data helps make more realistic assessments of dietary pesticide risk. In 2002 there were 5,759 samples of more than 100 kinds of commodities. Domestic and imported produce were tested. All samples were tested with multi-residue screens capable of detecting more than 200 pesticides and breakdown products. **No residues were detected in 63.7 percent of the samples. Residues within tolerance (the legal limits set by the U.S. Environmental Protection Agency [U.S.EPA]) were found in about 35 percent of the samples. The majority of these samples had residues at less than 10 percent of the tolerance level. Illegal residues were found in 1.3 percent of samples. Of these, 0.04 percent had residues that were over the tolerance level, and 1.26 percent had residues of a pesticide not authorized for use on the commodity.**

In this program, DPR concentrates monitoring on commodities with:

- A history of violation (domestic and foreign).
- A significant percentage of detectable residues in previous years.
- A dietary significance based on consumption frequencies and quantities consumed taking into consideration the

dietary patterns of adults, infants, children, and ethnic groups.

Findings and Significance

The validity of any sampling program lies in its design and in its ability to replicate the results. Over the past decade, even as the number of samples varied, the findings have been consistent from year to year. Most residues are below detectable limits. Residues that are found are usually at levels that are measured at a fraction of a part per million (ppm). Less than one percent of samples have residues over the tolerance levels. A tolerance is the highest residue level of the particular pesticide that is legally allowed on the particular commodity. A tolerance is set by U.S. EPA for regulatory purposes and is established at a level that incorporates a margin of safety, and usually assumes a lifetime of consumption of the commodity at the maximum allowable residue level.

While the goal of DPR's regulatory program is to ensure that all food is in compliance with pesticide safety standards, an occasional produce item slightly above tolerance should not automatically be considered a health hazard. The results from years of DPR residue monitoring document the safety of produce grown and consumed in California.

The [data](#) collected in 2002 are extensive and available for downloading.

REF: California Department of Pesticide Regulation [Website](#).



DPR Plans More Restrictions on Methyl Bromide

The California Department of Pesticide Regulation will propose new methyl bromide regulations to restrict levels of the fumigant that may persist in the air for several weeks. The new rules would impose the first geographic use limits on methyl bromide in the nation, and DPR will call on federal regulators to adopt a national standard based on the California model.

The proposed regulations are aimed at enhancing protection for workers and others who face potential exposure when multiple fumigations occur in the course of several weeks -- also known as "seasonal" exposures.

DPR has not found any imminent health hazard to communities from seasonal exposures to methyl bromide in recent years, based on air monitoring of high-use areas. In 2001, the highest ambient air samples were slightly more than half the level at which DPR would take action under the new rules.

"Our proposed regulations are preventive, not reactive," said DPR Director Paul Helliker. "Air monitoring data, combined with the best scientific evidence available, show that seasonal air levels of methyl bromide pose no immediate health concerns for communities. At the same time, we want to enhance protection for workers who may face ongoing exposure to methyl bromide from field fumigation."

California agriculture has dramatically reduced its use of methyl bromide in recent years, and the state no longer

leads the nation in field fumigations. "But some methyl bromide applications may well continue due to a lack of alternatives," said Helliker. "DPR's goal is to ensure that any future uses of methyl bromide in California will continue to provide a sufficient margin of safety for workers and the public," he said.

"California now has the most comprehensive, stringent restrictions on methyl bromide in the country, and we urge the U.S. Environmental Protection Agency to adopt our rules as a national standard," said Helliker. "While affording greater protection for all, this would also provide a level playing field for agriculture and create more incentive to find safer and more effective alternatives to methyl bromide."

DPR previously adopted regulations aimed at limiting short-term (24-hour) exposures to methyl bromide in the air to no more than 210 parts per billion (ppb). While maintaining that same short-term standard, DPR now proposes an additional regulatory action level averaging no more than 9 ppb for seasonal (four-to-eight-week) exposures for children, and 16 ppb for adults. (One part per billion is equivalent to one second of time in about 32 years, or one drop of liquid in a full tanker of a gasoline delivery truck.) DPR's action levels for both short-term and seasonal exposures include a 100-fold margin of safety.

To prevent air levels from exceeding these seasonal regulatory standards, DPR proposes to limit any single township to total applications of less than 270,000 pounds a month. (A township is a survey unit of 36 square miles.) In 2001, the highest monthly application occurred in a township on the border of Santa Cruz and Monterey counties. That township had total applications of 202,000 pounds in one month.

DPR already requires buffer zones and other precautions near schools and other sensitive sites that meet the 9 ppb air standard for children. The new rules will mandate more protective gear and work-time restrictions for laborers (based on the 16 ppb adult standard).

DPR has posted the proposed regulations online at <www.cdpr.ca.gov> Fact sheets are posted at <www.cdpr.ca.gov/docs/dprdocs/methbrom/mb_main.htm>.

DPR's proposed regulations are based on numerous scientific studies and extensive air monitoring conducted since the early 1990's. DPR scientists completed a risk assessment for methyl bromide in 1999 and sent their scientific document to the National Academies of Science (NAS) for review and comment. An NAS panel endorsed DPR's findings for short-term exposure action levels.

In 2000, DPR imposed new regulations for methyl bromide that included buffer zones, advance notification for field fumigations, and other protections. The rules were based on the 210 ppb standard for short-term exposures. No regulatory action level was set for seasonal exposures, due to a lack of scientific data, but DPR used a provisional "target level" of 1 ppb to identify areas with the highest seasonal air levels of methyl bromide.

DPR scientists then began to review air monitoring data and assess the need for additional regulatory safeguards. The NAS panel supported DPR's approach. The panel also recommended an additional toxicology study to establish subchronic (seasonal) action levels for methyl bromide exposure.

DPR's methyl bromide regulations have been the subject of lawsuits by both environmental and agricultural interests. To resolve that litigation, DPR agreed to reassess the regulations' potential economic impact on farmers, and to consider seasonal exposure standards. The rules imposed in 2000 were readopted as emergency regulations, pending introduction of a new regulatory package this year.

After reviewing all available data, DPR scientists recommended seasonal exposure action levels of 9 ppb for children, and 16 ppb for adults. The recommendation was based on studies considered for DPR's 1999 risk assessment, supplemented by a recent study submitted by the methyl bromide industry to address specific subchronic exposure issues.

However, some industry advocates have argued that DPR should allow exposure levels of up to 36 ppb for children and 64 ppb for workers. Some environmental advocates favor a 1 ppb level. DPR expects to hear more on this issue during the public comment period.

DPR's actions on methyl bromide are separate from regulatory actions under the federal Clean Air Act and the Montreal Protocol, an international agreement. Based on evidence that methyl bromide depletes the ozone layer in the stratosphere, the United States has agreed to end production of the fumigant by 2005. However, federal and international authorities are now considering "critical exemptions" to allow continued use when no feasible alternatives exist.

Meanwhile, DPR and California agriculture have already made significant strides in reducing methyl bromide use. California used 42 percent of all methyl bromide produced in the United States for farm field fumigation in 1997, according to U.S. EPA. By 2001, California's farm field use had fallen to 27 percent of the national use, compared to 45 percent for Florida, according to industry estimates provided to U.S. EPA.

That decline corresponds to DPR use reports that show methyl bromide use in California fell from more than 15 million pounds in 1999 to 6.6 million pounds in 2001. Factors contributing to the decline include increasing DPR restrictions, use of other fumigants, research on less-toxic alternatives supported by DPR and industry; and reductions mandated by the Clean Air Act.

REF: California Department of Pesticide Regulation News, September 18, 2003 (03-16)



FoodNet Surveillance Report for 2001

The Foodborne Diseases Active Surveillance Network (FoodNet) released its FoodNet Surveillance Report for 2001. This final report is used to document the effectiveness of new food safety control measures in decreasing the number of cases of foodborne diseases that occur in the U.S. each year.

Following are key findings as disclosed in the Executive Summary:

- "There has been a sustained decline in the incidence of *Yersinia*, *Listeria*, *Campylobacter*, and *Salmonella typhimurium* over the past six years. These declines indicate important progress toward achieving the U.S. Department of Health and Human Services Healthy People 2010 objectives of reducing the incidence of several foodborne diseases by the end of the decade. However, additional measures will be needed to further reduce the incidence of these diseases to achieve our national health objectives by 2010."
- "The decline in the incidence of infections cause by *Yersinia*, *Listeria*, *Campylobacter*, and *Salmonella typhimurium* are unlikely to be due to surveillance artifacts. FoodNet conducts several studies to monitor the surveillance factors that can influence the incidence of these laboratory-diagnosed foodborne diseases. These factors include the frequency with which persons with gastrointestinal symptoms seek medical care, the frequency with which diagnostic stool specimens are submitted to clinical laboratories, and the frequency with which the laboratories routinely test stool specimens for various pathogens. We are unaware of any changes in these factors that might explain the magnitude of the declines observed in the reported foodborne infections."

- "Food animals are major sources of *Yersinia*, *Listeria*, *Campylobacter*, and *Salmonella typhimurium*. One contributing factor to the decline in foodborne infections caused by these pathogens is likely to be change in the industry and regulatory approach to meat and poultry safety. Beginning in 1997, the USDA-FSIS began implementing the Pathogen Reduction/Hazard Analysis Critical Control Point (PR/HACCP) systems regulations in the meat and poultry slaughter and processing plants. Additional evidence of the contribution of the USDA regulations to the decline in the incidence of *Salmonella* infections in humans described in this report is the decline in prevalence of *Salmonella* isolated from FSIS-regulated meat and poultry products."
- "Enhanced surveillance and outbreak investigations have identified new control measures and focused industry attention on foodborne illness, so that control measures are more likely to be implemented. Recent interventions include egg safety programs for the prevention of *Salmonella enteritidis* infections, increased attention to fresh produce safety through better agricultural practices on farms and [in] food processing, regulation of fruit and vegetable juice, industry efforts to reduce food contamination, food safety education, and increased regulation of imported food."
- "Although there have been important declines in the incidence of infection for several foodborne diseases, the incidence of foodborne diseases remains high. Efforts to reduce the rate of foodborne diseases might include steps to reduce the prevalence of these pathogens in their respective important animal reservoirs; e.g., cattle (*Escherichia coli* O157), egg-laying chickens (*Salmonella enteritidis*), and seafood, particularly oysters (*Vibrio*). Implementation of nationwide, consistent, on-farm preventive controls would reduce the risk of human illness from *Salmonella enteritidis*-contaminated eggs."
- "The lack of a sustained decline in *E. coli* O157 infections indicates a need for increased efforts to reduce the burdens of these infections. Preventing *E. coli* O157 will not be a simple task because it is transmitted through food, water, person-to-person contact, and direct animal exposure. FoodNet studies and recent outbreaks have shown that an important route of transmission is direct contact with cattle or their environment. Strategies that reduce *E. coli* O157 on farms could decrease direct contact infection and food contamination, as well as entry into the water supply."
- "The high incidence of foodborne diseases in infants and young children is a major concern. FoodNet studies have shown that breast-feeding of infants is important in preventing foodborne disease in infants. To determine other opportunities for prevention of foodborne diseases among children, FoodNet began a case-control study in 2002 of sporadic cases of *Salmonella* and *Campylobacter* among young children."
- "The increase in the incidence of infections caused by *Salmonella newport* represents an emerging challenge to public health. Many of these isolates are resistant to nine or more antimicrobial agents, including all agents approved for oral use in children. Further studies are necessary to understand and resolve these problems. FoodNet recently began a case-control study of sporadic cases of *Salmonella newport* to assess possible risk factors and opportunities for prevention."

REF: FSNET September 9, 2003



FDA Issues Advisory on Star Anise "Teas"

The Food and Drug Administration (FDA) is advising consumers not to consume "teas" brewed from star anise. It has come to FDA's attention that brewed "teas" containing star anise have been associated with illnesses affecting about 40 individuals, including approximately 15 infants. The illnesses, which occurred over the last two

years, ranged from serious neurological effects, such as seizures, to vomiting, jitteriness and rapid eye movement.

Although the labeling of "teas" that contain star anise does not make claims for the product, FDA understands that these products are popularly believed to help against colic in infants. FDA is unaware of scientific evidence to support benefits from "teas" brewed from star anise. Given that fact, consumers should not use them or give them to infants and children.

FDA has not yet identified the specific type of star anise associated with the illnesses. For this reason, the agency is issuing this advisory as an interim measure while it continues to gather additional information, including that from some European countries that have reported similar outbreaks of seizures in individuals who have consumed tea brewed from star anise.

"One of FDA's highest priorities is to make sure that consumers have accurate information about the products FDA regulates," said FDA Commissioner Mark B. McClellan. "This case illustrates that FDA will take action to protect consumers against products that may pose health risks."

FDA is concerned that commonly available Chinese star anise (*Illicium verum*), a product considered by FDA to be generally recognized as safe (GRAS), may contain Japanese star anise (*Illicium anisatum*), which has long been recognized as toxic in many countries and which should be used for decorative purposes only. At this time, FDA cannot determine if the star anise associated with the illnesses was associated with Japanese star anise or a mixture of Chinese and Japanese star anise.

Japanese star anise in its dried or processed form cannot be distinguished from Chinese star anise through visual examination. Therefore, FDA is evaluating chemical analytical methods that will differentiate between the two species of star anise. Until FDA is able to differentiate between Japanese and Chinese star anise, it is advising the public not to consume "tea" brewed from any star anise. As part of its ongoing efforts to protect consumers from unsafe products, FDA will monitor imports of star anise entering the United States from various countries to ensure that any imports of Japanese star anise are not labeled or otherwise indicated for use as a food.

FDA considers Chinese star anise to be GRAS when used as a spice or flavoring; Japanese star anise is not GRAS. GRAS status means that a food substance is considered by qualified experts to be safe for its intended use. Safety must be adequately shown through scientific procedures and/or experience based on a common history of use in food, depending on the substance.

The initial reported illnesses were identified retrospectively through a record review after a resident physician from Miami Children's Hospital treating an infant with seizures associated with the ingestion of a star anise-containing tea reported his findings to the Florida Poison Information Center (FPIC). FPIC then reported the findings to the FDA.

All the affected individuals, including infants, involved in these reported cases recovered without complications.

FDA has since learned of similar reports from Florida, Illinois, New Jersey, Texas, and Washington as well as the Netherlands, France, and Spain.

As a public health agency, FDA is committed to protecting and advancing the public health. FDA is therefore exploring what additional actions it can take to protect consumers from the risks from products containing Japanese star anise.

REF: FDA News, September 10, 2003



FDA Announces Plans to Enforce FQPA Tolerances

FDA has released draft guidance on how it plans to enforce pesticide tolerances shortly after EPA has changed them through FQPA-mandated reassessment process. If FDA finds a food containing a pesticide at a level that was previously allowed but has since been prohibited, the party responsible for the food must demonstrate that the residue is the result of a lawful pesticide application or use that occurred before tolerance changes became effective to avoid enforcement action, the administration said in its draft guidance.

FDA is not asking companies to maintain a specific set of documents to support those claims. Instead, it will be up to the firm to determine how it will document that the food was packed or processed during acceptable timeframes. FDA suggests that companies use information associated with packing codes and batch and inventory records.

This enforcement approach will apply to both domestic and imported food. Normally, foods containing illegal pesticides or residue levels are found by FDA to be in violation of the law. But FFDCA Sec. 408 (1)(5) exempts such food from enforcement as long as the pesticide in question was applied in a lawful manner; the residue doesn't exceed the previously set level; and EPA hasn't determined that consumption of the food poses unreasonable dietary risk.

Companies will be given an opportunity to show FDA that a formerly approved residue is the result of legal application through the date by which the administration anticipates that such a product would remain in the channels of trade. That date is termed the "showing date." For example, FDA said that "for certain processed foods, i.e. frozen, dried, and canned foods, this date will generally be four years from the time the treated crop is harvested" because that is the length of time such food is expected to move through the marketplace. After that, FDA will assume that a company can't show that an illegal residue is the result of a lawful application or use and initiate enforcement action. Companies will have an opportunity to challenge that assumption.

In defining showing dates, FDA plans to consider the following factors:

- Degradation rates of pesticides. If the degradation rate is known, FDA can determine when the formally approved residues on a product will diminish to non-detectable levels. In such cases, FDA said it is likely to designate the showing date for the processed food as the last date a residue, resulting from a legal pesticide application or use, would be detectable in fresh food.
- Market clearance. If a pesticide remains at detectable levels the entire time the food is in the marketplace, FDA is likely to designate the showing date based on how long it would take a lawfully treated fresh product to clear the market.

For each pesticide that is subject to a tolerance change under FQPA, FDA will publish on its Web site the showing dates it intends to use for affected food commodities. It will also publish any other determinations it has made on a tolerance, such as the last day FDA expects a lawfully treated product to be in the marketplace. The proposed guidelines can be found at www.cfsan.fda.gov/~dms/pesguid.html. (Pesticide & Toxic Chemical News, Vol. 31, No. 40, July 28, 2003)

REF: Pesticide Reports, Oklahoma Cooperative Extension Service. October 2003



USGS Releases Study on Toxic Rainfall in San Joaquin Valley

The pesticides diazinon and chlorpyrifos were found in all rainfall samples collected by the U.S. Geological Survey (USGS) in the area of Modesto, Calif., during January and February 2001 storms. The concentrations of these two insecticides in the rainfall samples exceeded proposed state guidelines for the protection of aquatic life in most samples, by up to a factor of 10 for diazinon, and up to a factor of 7.4 for chlorpyrifos.

“Many pesticides become airborne during the application process and can drift off-site,” said Michael Majewski, a USGS scientist and expert in atmospheric deposition who contributed to the study. “After they are applied, many pesticides volatilize into the lower atmosphere, a process that can continue for days, weeks, or months after the application, depending on the compound. In addition, pesticides can become airborne attached to windblown dust.”

Rainfall samples collected during the dormant spray season in Modesto and the surrounding agricultural areas exceeded the state guidelines for diazinon concentrations by an average factor of 5.7 for diazinon and 3.1 for chlorpyrifos. Simultaneously, storm runoff samples were collected from an urban storm drain where diazinon concentration exceeded the proposed state aquatic life guidelines by an average factor of 9.5. Sixty-eight percent of the diazinon concentration found in the storm drain runoff could be accounted for by the concentration in the rainfall.

Additionally, samples were collected from the San Joaquin, Merced, Stanislaus, and Tuolumne rivers, and Orestimba Creek during this study.

Sixty out of a total of 240 of these samples exceeded the proposed state guideline for diazinon and 18 for chlorpyrifos. The highest concentrations of diazinon occurred in the San Joaquin River where concentrations exceeded the state guidelines by as much as 3.6 times. The highest chlorpyrifos concentrations occurred at Orestimba Creek where samples exceeded the state guidelines by a factor of 3.4.

“It is important to recognize that the application of these pesticides affect all parts of the hydrologic cycle,” said the report’s lead author, USGS scientist Celia Zamora. “It is during rainfall events that these pesticides get washed out of the atmosphere and produce runoff at surprisingly high levels that exceed the guidelines for protection of aquatic life.”

The study will continue through 2004 at six sites in the San Joaquin River Basin and two additional sites in the Sacramento River Basin. The complete results of the study will be forthcoming. This study was funded by the California Department of Pesticide Regulation to provide additional information to the Central Valley Regional Water Quality Control Board for their development of Total Maximum Daily Load regulation for diazinon and chlorpyrifos in the San Joaquin Basin.

The USGS report entitled, “Diazinon and Chlorpyrifos Loads in Precipitation and Urban and Agricultural Storm Runoff during January and February 2001 in the San Joaquin River Basin, California,” by Celia Zamora, Charles R. Kratzer, Michael S. Majewski, and Donna L. Knifong, can be found on the web at:

<http://water.usgs.gov/pubs/wri/wri034091>. (FIEN email updates, August 18, 2003)

REF: Pesticide Reports, Oklahoma Cooperative Extension Service. December 2003



DPR Releases Pesticide Use Statistics for 2002; New Database Provides More Public Access

The California Department of Pesticide Regulation today reported that total pounds of pesticide applications rose 14 percent from 2001 to 2002, although use still fell below every other year in the past decade.

Preliminary DPR statistics show reported pesticide applications totaled 172 million pounds, compared to 151 million pounds in 2001, and 188 million pounds in 2000. Pesticide use in previous years ranged up to more than 214 million pounds.

Higher acreage in several major crops helped explain increased pesticide use, according to a DPR analysis. (The 2002 summary includes a five-year analysis of pesticide use for 14 major commodities.) Pesticide use varies from year to year, depending on pest pressure, weather, acreage, cropping patterns, economic conditions, and other factors.

Search for data online

More detailed pesticide use data can also be accessed through a new DPR online feature, the California Pesticide Information Portal (CalPIP). The CalPIP database provides public access to detailed pesticide use information from 1990 to 2001. (Data for 2002 are expected to be available on CalPIP by the end of this month.)

Sulfur accounted for nearly one-third of the increase in pounds for 2002. Sulfur typically accounts for about one-third of all pounds applied annually. A natural fungicide used by conventional and organic growers, sulfur is also more economical than some other fungicides.

Major crops with an overall increase in pesticide pounds applied included processing tomatoes (3 million pound increase), raisin and table grapes (3 million pounds), carrots (2.2 million pounds), almonds (2.1 million pounds), potatoes (1.6 million pounds), and wine grapes (1.5 million pounds). Major crops with fewer pounds applied included cotton (900,000 pounds).

Use varied among categories of pesticides. Organophosphate and carbamate use declined again in 2002, by 700,000 pounds (8 percent) and 600,000 acres treated (8 percent). DPR has undertaken a number of initiatives -- including grant programs and regulatory actions -- to reduce the use of these highly-toxic insecticides.

Fumigant use varied by chemical. In the face of increasing state restrictions and a federal phase-down, methyl bromide use continued to decline, down by 21,000 pounds in 2002, to less than 6.6 million pounds. (Since 1995, methyl bromide use has fallen by more than 10 million pounds.) Meanwhile, 2002 use of the replacement fumigant metam-sodium increased by 4.2 million pounds (37 percent), and use of the fumigant 1,3-D increased by 1.4 million pounds (35 percent).

Statistical changes from 2001 to 2002:

- - Use of reduced-risk pesticides increased by 183,000 pounds (32 percent) and by 845,000 acres treated (29 percent).
- - Chemicals classified as reproductive toxins increased by 1.8 million pounds (9 percent) but decreased by 300,000 cumulative acres treated (10 percent). The increase in pounds was predominantly due to use of metam-sodium.
- - A similar pattern appeared for chemicals classified as carcinogens. Use of these chemicals increased 3.4 million pounds (15 percent) but decreased by 200,000 acres (5 percent). The increase in pounds was mostly due to metam-

sodium and 1,3-D.

-- Chemicals categorized as ground water contaminants increased by about 220,000 pounds (11 percent). Cumulative acres treated increased by about 18,000 acres (1 percent). Most of the increase was due to applications of the herbicides diuron and simazine.

In analyzing pesticide data, DPR calculates both pounds applied and cumulative acres treated because these statistics offer different perspectives on use.

While many pesticides are used at a rate of one to two pounds per acre, fumigants are often applied at hundreds of pounds per acre, so gauging use in pounds emphasizes fumigants. As measured in pounds applied, the top pesticides in 2002 included sulfur (53.6 million pounds), petroleum oils (17.7 million pounds), metam-sodium (15.5 million pounds), methyl bromide (6.6 million pounds), and the herbicide glyphosate (5.6 million pounds).

Use by acres treated

As measured in acres treated, top pesticides included sulfur (5.6 million acres) and three herbicides: glyphosate (3.6 million acres), oxyfluorfen (1.6 million acres), and paraquat dichloride (1.4 million acres). The widely-used insecticide chlorpyrifos (1.2 million acres) is also on the list. These statistics reflect cumulative treated acres. (For example, one acre treated five times equals five treated acres.) The statistics do not reflect planted acreage.

Since 1994, reported pesticide use, as measured in pounds, has fluctuated from year to year, according to DPR analysts. They found that relatively short periods of time (three to five years) may suggest trends, such as the increased pesticide use from 1994 to 1998, or decreased use noted from 1998 to 2001. Overall use patterns from 1994 to 2002 do not establish a firm statistical trend.

However, DPR's pesticide use data are valuable for other purposes. The data helps DPR conduct pesticide risk assessments, formulate guidelines to protect field workers, devise restrictions for endangered species habitat, assist with programs to preserve air and water quality, and develop least-toxic pest management strategies.

To help provide better public access to pesticide use information, DPR has created the CalPIP database, the nation's most extensive source of pesticide use information. The system was activated for testing several months ago, and has already received more than 1,000 queries and retrieved more than ten million records.

The free, public access system can provide pesticide use statistics by year, application location, the site or crop treated, the pesticide product name, the chemical name (active ingredient), and the application pattern (ground or air).

For example, a user could request the following information: How many pounds of pesticide were applied in my county in a particular year? In my zip code? How many pounds of herbicides were applied to apples in my zip code? What were the herbicide brand names? How were they applied?

After such queries are submitted to CalPIP, the online system processes the information, then notifies the user by e-mail and provides an online link to the data requested. Query results can be displayed as graphs or tables that can be viewed online, or downloaded to the user's computer.

CalPIP also allows users to link pesticide use data in with DPR's database of labels for the 12,000 pesticide products registered in California. DPR's pesticide label database includes such information as the manufacturer, pesticide type (such as herbicide, insecticide, disinfectant), active ingredient, target pests, application sites (such as crop, roadside, or structure), and certain chemical and environmental characteristics.

Future enhancements for CalPIP may include links to DPR databases for pesticide residues, surface and ground

water, and illness reports.

To access the CalPIP database, link to <<http://calpip.cdpr.ca.gov>>. Questions about use of CalPIP should be e-mailed to: calpip_comments@cdpr.ca.gov.

Note to editors: Statistics for individual counties and other lists may be found at <www.cdpr.ca.gov/docs/pur/pur02rep/02_pur.htm>.

REF: California Department of Pesticide Regulation Press Release, November 13, 2003 (03-20)



◆ TOXICOLOGY TIDBITS ◆

World Health Report 2002

The World Health Organization's (WHO) [World Health Report 2002](#), which was officially launched on 30 October last year, represents one of the largest research projects ever undertaken by the World Health Organization. The report, subtitled *Reducing risks, promoting healthy life*, measures the amount of disease, disability and death in the world today that can be attributed to some of the most important risks to human health. It then goes on to calculate how much of this present burden could be avoided in the next 20 years, opening the door to a healthier future for people in all countries.

For the first time, a summary of the report in all six WHO official languages - English, French, Spanish, Arabic, Chinese and Russian - appears on the WHO website.

The report identifies the top ten risks, globally and regionally, in terms of the burden of disease they cause. **The ten leading risk factors globally are: underweight; unsafe sex; high blood pressure; tobacco consumption; alcohol consumption; unsafe water, sanitation and hygiene; iron deficiency; indoor smoke from solid fuels; high cholesterol; and obesity. Together, these account for more than one-third of all deaths worldwide.**

REF: [WHO website](#).



Perchlorate: Questions and Answers

FDA's Center for Food Safety and Applied Nutrition has released a new document on perchlorate, the chemical that made headlines earlier this year when it was found in a small number of winter-grown lettuce sold in California grocery stores. To read the Q&A go to: <http://www.cfsan.fda.gov/~dms/clo4qa.html>

REF: USDA CFSAN/Office of Plant & Dairy Foods & Beverages, September 20, 2003



Cigarette Smoking Among Adults --- United States, 2001

One of the national health objectives for the United States for 2010 is to reduce the prevalence of cigarette smoking among adults to $\leq 12\%$. To assess progress toward this objective, CDC analyzed self-reported data from the 2001 National Health Interview Survey (NHIS). The findings of this analysis indicate that, in 2001, approximately 22.8% of U.S. adults were current smokers compared with 25.0% in 1993. During 1965-2001, smoking prevalence declined faster among non-Hispanic blacks aged ≥ 18 years than among non-Hispanic whites the same age. Preliminary data for January-March 2002 indicate a continuing decline in current smoking prevalence among adults overall. However, the overall decline in smoking is not occurring at a rate that will meet the national health objective by 2010. Increased emphasis on a comprehensive approach to cessation that comprises educational, economic, clinical, and regulatory strategies is required to further reduce the prevalence of smoking in the United States.

REF: *Morbidity and Mortality Weekly Report* October 10, 2003, 52(40).



Norovirus Website

Norovirus, also known as Norwalklike viruses, may be the leading cause of foodborne illness. According to the Centers for Disease Control and Prevention (CDC), it is now thought that at least 50 percent of all foodborne outbreaks of gastroenteritis can be attributed to noroviruses.

Familiar to many as the culprit causing illness among cruise lines in 2002, the viruses can be transmitted by food, or person to person. They can be tough to stamp out and persistent problem makers.

According to CDC, most outbreaks are likely to arise through direct contamination of food by a food handler immediately before it is eaten. Food and drink can easily become contaminated because it may take fewer than 100 norovirus particles to make a person sick. Outbreaks have frequently been associated with cold foods, including various salads, sandwiches, and bakery products.

To help reduce norovirus-related illnesses, CDC has a new Web site (<http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm>) with:

- Norovirus Q&A
- Norovirus fact sheet
- Norovirus and food handlers

The site also includes a 24-page publication called "Norwalk-like Viruses: Public Health Consequences and Outbreak Management."

REF: The Food Safety Educator, Volume 8, No. 2, October 2003.



New Information on Dioxins

Dioxins is a subject that can be complex and confusing. New materials provide information about the Environmental Protection Agency's (EPA) draft risk assessment on dioxins (also called the dioxin reassessment). In addition to background information, these materials discuss possible effects of dioxin exposure in humans, include advice about consumption of food that might contain dioxins and explain the process for reviewing the report before it is finalized. The questions and answers provided here are not meant to comment on the scientific validity of the EPA report and should not be taken to indicate that the analysis or conclusions of the draft EPA dioxin report are final. For more information, see the [CFSAN Dioxin Q&A](#).

REF: IFT Weekly email 10/31/2003



California Restricts Ephedra "Supplements"

California has enacted a bill (SB582) to ban the sale and distribution of dietary supplements containing ephedrine alkaloids. Licensed practitioners can continue to prescribe or dispense such products (or their drug equivalents) and pharmacists can dispense them for certain medical conditions, but they cannot do so for purposes of weight loss, body building, or athletic performance enhancement. Products of this type that are not for resale within California are exempted. http://www.leginfo.ca.gov/pub/bill/sen/sb_0551-0600/sb_582_bill_20031012_chaptered.html

REF: Consumer Health Digest #03-41, October 21, 2003



Consumers in Oregon Area Advised of Risks Associated With Raw Sprouts

The Food and Drug Administration has been alerted to a recent increase in Salmonellosis cases by the Oregon Public Health Services possibly associated with the consumption of raw sprouts.

To date, six cases of *Salmonella* have been reported possibly linked to the consumption of sprouts. It is not clear what type of sprouts were the cause of the illnesses.

In light of this outbreak, FDA is reiterating its previous alerts about eating raw sprouts. Those persons who wish to reduce the risk of foodborne illness from sprouts are advised not to eat raw sprouts. This advice is particularly important for children, the elderly, and persons with weakened immune systems, all of whom are at high risk of developing serious illness due to foodborne disease. People in high-risk categories should not eat raw sprouts.

Salmonella is an organism that can cause serious and sometimes fatal infections in young children, frail or elderly people and others with weakened immune systems. Healthy persons infected with *Salmonella* often experience fever, diarrhea (which may be bloody), nausea, vomiting and abdominal pain. In rare circumstances, infection with *Salmonella* can result in the organism getting into the bloodstream and producing more severe illnesses such as arterial infections (i.e., infected aneurysms), endocarditis (swelling of the lining the heart) and arthritis. Most cases resolve without the need for medical attention.

REF: *FDA News Release*, November 26, 2003.



Food Safety Publications

For complete listings and links to the USDA's Food Safety and Inspection Service publications go to:
(<http://www.fsis.usda.gov/oa/pubs/consumerpubs.htm>)

REF: FSnet Nov. 2/03



Allergic to Latex? Poinsettia Plants May Pose Risk

Individuals with latex allergy should be cautious around poinsettia plants, since exposure may result in a severe

allergic reaction, according to preliminary research findings presented by Peter M. Ranta, M.D., Augusta, Ga., at the recent Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) in New Orleans.

The ornamental poinsettia plant (Euphorbiaceae), popular during the Christmas holiday season, is part of the same plant family as natural rubber latex (NRL), which is obtained from the Brazilian rubber tree (*Hevea brasiliensis*). Dr. Ranta and colleagues found two cross-reactive proteins in poinsettia extracts that correspond to proteins in natural rubber latex.

REF: Agnet Nov. 20/03



CHAPULINES Anyone??

State Health Department Issues Health Warning on Lead-Contaminated Chapulines (Grasshoppers)

Sacramento, CA – Consumers, particularly pregnant women and children, should avoid eating chapulines (grasshoppers) from Oaxaca, Mexico, because they may contain excessively high levels of lead that could cause serious health problems, State Health Director Diana M. Bontá, R.N., Dr.P.H., warned today.

"Lead is toxic to humans, especially infants, young children and developing fetuses, in both short- and long-term exposures," said Bontá. "Lead can cause damage to the central nervous system, resulting in learning disabilities and behavioral disorders that could last a lifetime."

Residents from some regions of Mexico eat chapulines (chap-oo-lean-ès) as a traditional snack food. Chapulines are usually prepared with ingredients such as garlic, salt, lime juice or a red chili powder coating. They are not widely available in commercial distribution and usually brought into the United States by individuals who have recently visited Oaxaca or other parts of Mexico.

The product, often a dull red color, is sold in small, unlabeled bags at Hispanic retail food stores, in restaurants and at flea markets. The public and sellers of chapulines are encouraged to contact the California Department of Health Services (CDHS) at (916) 445-2264 to provide information that can assist public health investigators in learning more about the potential threat that the product poses to children.

Recent analysis of chapulines from Oaxaca, Mexico, showed that they may contain as much as 2,300 micrograms of lead per gram of product. The U.S. Food and Drug Administration (FDA) has recommended that children under age 6 should consume on average no more than 6.0 micrograms of lead each day from all food sources. A young child eating one of these highly contaminated chapulines could ingest nearly 60 times his or her tolerable daily intake for lead. While some of the chapulines analyzed contained no detectable lead, consumers have no practical way of determining if the product is contaminated with lead. The source of lead in the chapulines from Oaxaca is under investigation.

CDHS began investigating the product after it was referred to the department by the Monterey County Health Department. County investigations of several lead poisoning cases involving children determined that the children were eating chapulines. CDHS investigators are working with FDA and local health departments to ensure that the wholesale and retail food industries are aware of the potential hazards associated with lead in foods.

Parents of children who may have consumed chapulines should consult with their physician or health care provider to determine if further testing is warranted. For more information about lead poisoning, parents may contact their local childhood lead poisoning prevention program or local public health department. Additional information and a list of local lead prevention programs are also available at DHS' Web site at: <http://www.dhs.cahwnet.gov/childlead/> or by calling the California Childhood Lead Poisoning Prevention

REF: CDHS press release, 03-92 November 13, 2003



It's that time of year again...

State Health Director Warns Against Eating Wild Mushrooms

Sacramento, CA - With the onset of the rainy season that promotes the growth of wild mushrooms, State Health Director Diana M. Bontá, R.N., Dr.P.H., today reminded consumers about the dangers of eating wild mushrooms.

"Wild mushrooms should not be eaten unless they have been carefully examined and determined edible by a recognized mushroom expert because some poisonous mushrooms look the same as non-poisonous mushrooms," Bontá said.

During the past decade, in California, at least two deaths, multiple hospitalizations and an unknown number of gastrointestinal illnesses have been attributed to the consumption of wild mushrooms. During the winter of 1996-97, Northern California reported two deaths attributed to *Amanita phalloides*, also known as the "death-cap" mushroom. This mushroom grows in some regions of California year-round, but is most commonly found during the rainy fall and winter months.

"Mushroom collectors sometimes overestimate their ability to distinguish deadly mushrooms from edible mushrooms, with potentially tragic results," Bontá said. "Individuals who refer to mushroom guidebooks or have families who have collected mushrooms for many years in their native countries may mistakenly believe that they can distinguish the deadly mushroom found in the Western United States from edible varieties."

Eating poisonous mushrooms can cause abdominal pain, cramping, vomiting, diarrhea, liver damage and death. Abdominal symptoms are usually delayed six to 12 hours, so victims may not initially connect their symptoms to the wild mushrooms. As the initial gastrointestinal symptoms subside, evidence of liver damage appears and some victims may require a liver transplant to survive.

Individuals who develop any of these symptoms after eating wild mushrooms should immediately contact the

California Poison Control System at 1-800-8-POISON (1-800-876-4766) and seek medical attention.

REF: CDHS Press Release, 03-78, November 3, 2003



The Industry Task Force II on 2,4-D is Highlighting Results from Two Studies

Studies published recently in peer review journals and conducted by researchers at the U.S. National Cancer Institute, show 2,4-D does not present a cancer risk to farmers and pesticide applicators. The first study is an analysis of three earlier ones, conducted in Kansas, Nebraska, Iowa and Minnesota in the 1980s and 1990s, which linked the chemical to non-Hodgkin's lymphoma. According to the study, which was published in the Journal of Occupational Environmental Medicine, an analysis of the pooled data shows no association between the two. The second report focuses on the ongoing Agricultural Health Study, which is examining the health of 55,332 male pesticide applicators. According to the second study's results, the cancer incidence for participants is significantly lower than that of the general population. The researchers also found no connection between 2,4-D use and prostate cancer. The second study was published in the American Journal of Epidemiology. (Pesticide & Toxic Chemical News, Vol. 31, No. 50, October 6, 2003)

REF: Pesticide Reports, November 2003



EPA Update on Creosote

EPA is announcing the results of its preliminary assessment of potential health risks, as well as ecological effects and environmental risks, associated with creosote. The assessment includes an evaluation of the potential risks to handlers and post-application workers from exposure to creosote. Creosote is a possible human carcinogen and has no registered residential uses. It is primarily used on utility poles and railroad ties. It is important to note that since this draft risk assessment is in the public review and comment phase, its findings are preliminary in nature and are subject to additional analysis. It is, therefore, premature for EPA to reach conclusions about the potential for creosote-treated wood products to contribute to cancer risk in workers and handlers of this wood. EPA must receive comments, identified by Docket Number OPP-2003-0248, by February 3, 2004. The full preliminary assessment is available for public inspection in [EPA's Docket](#). The Federal Register Notice can be found at www.epa.gov/fedrgstr.

REF: [US EPA Press Release](#), December 5, 2003



Mosquito Coils or Mini-Toxic Fires?



Two recent studies have examined the potential threat to public health from foreign-made mosquito coils. In the first study, researchers characterized emissions from four common brands of mosquito coils from China and two common brands from Malaysia. The coils contained pyrethrins ranging from 0.3 to 0.4 percent. The insecticide is mixed with combustible materials that have the ability to smolder without flame. It was determined that these materials emitted as much particulate matter (2.5 microns) as 75 to 137 cigarettes per coil, and that polycyclic aromatic hydrocarbons and benzene were present in the smoke. When coupled with the concept that a house might be closed to keep mosquito biting down, a sleeping room with a burning or burnt coil could lead to high acute exposure.

In the second study, researchers focused on measuring the insecticide octachlorodipropyl ether (S-2) in mosquito coils collected in Indonesian and Asian markets in Southern California (being sold illegally). Coils containing S-2 have been linked to emissions of bis(chloromethyl)ether (BCME), a potent lung carcinogen formed by combustion of S-2. Of the 16 coils tested, ten were found to contain S-2, and none of them listed it on the label. (*Pesticide & Toxic Chemical News*, 9/8/03).

REF: Chemically Speaking, October 2003.



New Safety Leaflets Available

The California Department of Pesticide Regulation Worker Health and Safety Branch has revised their Pesticide Safety Information Series (PSIS) leaflets primarily as a training aid for employees. California regulations require these documents to be part of pesticide handler and field worker training. The leaflets are easier to read, and they help workers and employers handle pesticides properly. English and Spanish versions are available at www.cdpr.ca.gov/docs/whs/psi2menu.htm



VETERINARY NOTES



FDA Issues Guidance on Evaluating the Safety of Antimicrobial New Animal Drugs to Help Prevent Creating New Resistant Bacteria

The Food and Drug Administration (FDA) released a new guidance document that for the first time outlines a comprehensive evidence-based approach to preventing antimicrobial resistance that may result from the use of antimicrobial drugs in animals.

Antimicrobial drugs, such as antibiotics, are medicines often used to treat bacterial infections in both humans and animals. Their use has been one of the great advances in modern medicine – helping to prevent many of the leading causes of death for most of human history.

Regardless of why bacteria develop resistance to antimicrobials, when bacteria do develop such resistance, human and animal health is at risk because the medicines that we depend on to treat infections become ineffective. There are several important sources of this problem, including inappropriate use of antibiotics in people, that have been the subject of many public health initiatives by the Department of Health and Human Services and other organizations. The guidance released today by FDA is, however, the first that addresses, in a comprehensive manner, the issue of the use of antimicrobials in food producing animals as a contributing factor to the development of antimicrobial resistance.

The guidance provides a scientific process for assessing the likelihood that an antimicrobial drug used to treat an animal may cause an antimicrobial resistance problem in humans consuming meat or other byproducts from that animal. This process can help prevent antimicrobial drugs with a high risk of causing such problems from being improperly used in food producing animals, and thereby potentially leading to antimicrobial resistance in humans.

The new guidance encourages drug sponsors to use a risk assessment process to demonstrate that an antimicrobial drug used to treat food-producing animals will not create a risk of antimicrobial resistant bacteria likely to lead to human health problems.

The document, Guidance for Industry (GFI) #152 ("Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern"), is not a regulation. Instead it explains a science-based process drug sponsors may use when they seek approval of an antimicrobial for use in food-producing animals.

Sponsors may still use other methods to establish drug safety for these uses, as long as these methods comply with statutory and regulatory requirements. In general, written guidance helps sponsors understand FDA's process of evaluating whether a proposed product for approval can be used safely and effectively, in this case with respect to risks of creating antimicrobial resistance.

"Resistance to the antimicrobial drugs needed to treat human illnesses is a serious public health threat, and we intend to use the best science-based methods to prevent it," said FDA Commissioner Mark B. McClellan, M.D., Ph.D. "There are many factors contributing to the development of resistant bacteria. Attacking the problem on all fronts, including the appropriate use of antimicrobial drugs in veterinary medicine, is the best way to protect the health of the public. It's also the best way to promote the safe use of antimicrobials to protect the health of animals, including food-producing animals." Stephen Sundlof, D.V.M., Ph.D., Director of FDA's Center for Veterinary Medicine, added, "This guidance uses science to develop a risk-based approach to the issue of antimicrobial resistance. It permits us to help protect human health while giving veterinarians and livestock producers the tools they need to treat animals."

The pathway suggested in the guidance document establishes a three-part system for determining an antimicrobial drug's potential risk to humans if used to treat food-producing animals. The system's three parts are these:

- **Part One** is the "release assessment" which determines the probability that resistant bacteria will be present in animals as a result of the use of the antimicrobial new drug.
- **Part Two** is the "exposure estimate" which gauges the likelihood that humans would ingest the resistant bacteria.
- **Part Three** is the "consequence assessment" which assesses the chances that human exposure to the resistant bacteria would result in adverse human health consequences. In this context, these are situations in which a physician has difficulty treating a person with an antimicrobial drug because the bacteria infecting the person had acquired resistance to the drug and that resistance came from use of the drug in animals.

Under this system, all of these assessment processes are considered and integrated to determine the overall level of human health risk from resistant bacteria associated with an antimicrobial drug's use in animals.

If the assessments showed that the risks were significant, FDA could deny the application for marketing authorization, thus preventing the use of the drug in food animals, or FDA could approve the drug, but place conditions on its use designed to ensure it would not pose a human health risk.

More information is available online at www.fda.gov/oc/antimicrobial/questions.html.

REF: FDA News Release, P03-85, October 23, 2003



Residues of Veterinary Drugs On-line Database

Residues of Veterinary Drugs On-line Database FAO Food and Nutrition Paper 41 (Residues of veterinary drugs in animals and foods) is now accessible through an on-line database that contains information on veterinary drugs and their residues in foods as they have been adopted and proposed by JECFA. The database is searchable by substances or functional classes of drugs. Veterinary drugs can also be searched according to their status of evaluation (e.g. no ADI allocated, temporary MRL). The database is accessible from: www.fao.org/es/esn/jecfa/archive_en.stm

REF: Food Safety and Quality Update, Issue No 10, October 2003.



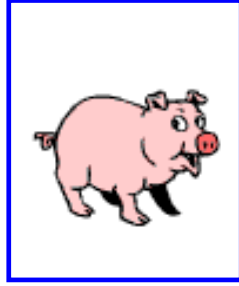
Recent Cases from the UC Davis California Animal Health and Food Safety Laboratory System

- **Cyanide poisoning** from the ingestion of heavenly bamboo (*Nandina domestica*) berries caused the death of a 2-year-old Boer goat after exhibiting weakness, respiratory distress, tremors and bloat. Cyanide was detected in stomach contents as well as muscle.
- A custom slaughter operation submitted a wild pig **carcass that was bright blue** throughout the body cavities, subcutaneous fat and dermal connective tissue. A dog attacked the pig when it wandered on to private property, and the dog owner noted the pig was bleeding excessively from the bite wounds. The blue pigment was from ingestion of **dyed anticoagulant grain baits** used on squirrels. The dye is intended to prevent accidental use of the grain by livestock owners. Low levels of diphacinone, an anticoagulant, was found in muscle tissue.
- In San Joaquin County, 25 cows from a pen of 180 cows had a severe drop in milk production. Most of the affected animals had diarrhea and pale mucous membranes. The hay contained a large amount of **Senecio vulgaris**, commonly known as groundsel. Hepatotoxic **pyrrolizidine alkaloids** (PAs) are the principal toxins in senecios. The quantity of the toxic alkaloids in Senecio varies with the species and stage of growth, and the young preflowering plant is the most toxic. The concentrations of PAs found in this hay sample were considered very high, with an estimated level of more than 400 ppm of the five types of PAs. The toxic dose of PAs from Senecio sp. is 1-2 mg PA/kg BW/day for cattle. If the animals were fed 10 pounds of hay per head per day, the estimated amount of PA intake was 1,818 mg PA per head per day or 4mg PA/kg BW/day for a 1,000 lb. cow. In cattle, the disease is often subacute with death resulting from the effects of liver failure. Signs include a decrease in appetite and milk production, followed by marked weight loss, an emaciated appearance and finally weakness and recumbency. Once signs appear, the course of events may take place over several days to weeks. A diagnosis of pyrrolizidine alkaloid poisoning was made, based on clinical and toxicological findings.
- Three Holstein cows died acutely after eating from a new load of **sudan hay**. The ocular fluid of one cow had a very high toxic **nitrate** concentration of 100 ppm (toxic > 30 ppm). No significant pathological lesions were seen, which is common with nitrate poisoning. Acute nitrate poisoning most often occurs when forage nitrate concentrations exceed 10,000 ppm (=1 percent; on a dry weight basis). The toxic principle of nitrate toxicosis is the reduction of nitrate to nitrite by rumen microorganisms. Clinical signs of **acute nitrate poisoning** include salivation, diarrhea, tremors, dyspnea, ataxia, rapid heart beat, and convulsions. Death may occur within six to 24 hours after exposure. Sudan grass is known to accumulate potentially toxic concentrations of nitrate as well as cyanide. The hay was not submitted for nitrate testing.
- **Cyanide poisoning** from the ingestion of **heavenly bamboo** (*Nandina domestica*) berries caused the death of a 2-year-old Boer goat after exhibiting weakness, respiratory distress, tremors and bloat. Cyanide was detected in stomach contents as well as muscle.
- **Poison hemlock poisoning** resulted in foaming at the mouth, seizures and death in three goats in Santa Cruz County. Several other animals became recumbent and had very pale mucous membranes. Plants from the pasture revealed the presence of poison hemlock, *Conium maculatum*, which contains a series of volatile alkaloids of which coniine, and gammaconiceine are predominant. Clinical signs in livestock exposed to poison hemlock can occur as early as an hour after ingestion and include nervousness, tremors, muscular weakness, incoordination and increased salivation. If sufficient plant material is ingested, the early stimulation phase is followed by severe depression and progressive paresis, leading to recumbency and respiratory depression. Death is usually the result of respiratory paralysis. Interestingly, the rumen contents submitted did not contain any of the listed alkaloids above our method detection limits, including the conium plant alkaloids. However, as conium alkaloids are very volatile, a negative result in rumen contents does not necessarily rule out poison hemlock poisoning.
- **Copper toxicosis** in a 16-month-old ewe resulted in acute onset of lateral recumbency and paddling. The liver had a very high, toxic copper concentration of 377 ppm (toxic for sheep >250 ppm). Copper accumulates in the liver during overexposure and once a toxic threshold (> 250 ppm) is reached, it may be released from liver into the bloodstream. Copper is a strong oxidizing agent and may lead to an acute hemolytic crisis with icterus, hemoglobinuria, and hemoglobinemia. When copper reaches the kidneys, elevated kidney copper concentrations may be observed. The lesions seen in this case were compatible with chronic copper poisoning. Prior to the onset of clinical signs, the animal had been observed chewing on a wooden shelter. Wood is commonly treated with copper-containing preservatives, and it is possible that the source of copper was the plywood. However, the

wood was not submitted for copper analysis.

REF: CAHFSLs Lab Notes, Fall, 2003.

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