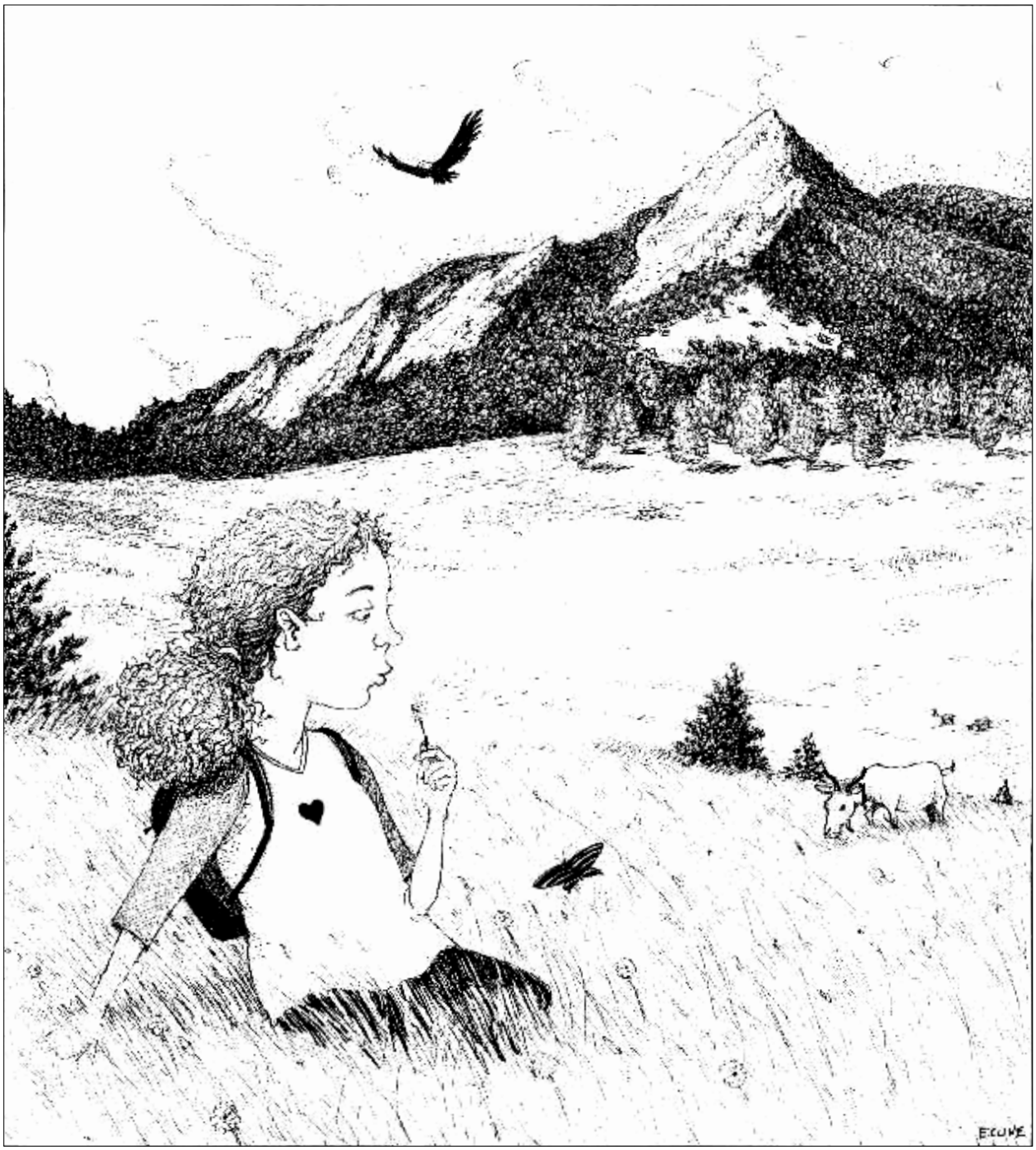
Volume 21 , Number 1 Spring 2001

Pesticides and You

News from Beyond Pesticides / National Coalition Against the Misuse of Pesticides (NCAMP)



Healthy Ecosystems, Healthy Children

Weather and the West Nile Virus • Economic and Environmental Impacts of Invasive Species and Their Management • Planning for Planting: How to Plan Your Organic Garden • ChemicalWATCH Factsheet: Glyphosate • Fluoride: The Hidden Poison in the National Organic Standards

Letter from Washington

Fighting Fluoride the Organic Way

While we are enjoying winter and the snow storms on the east coast, thoughts of Spring are not far off. What better way to plan for the glorious rebirth of Spring then to start planning a garden. This issue contains a piece that gets us thinking about steps in the preparation of an organic garden. Gardens are hopeful and positive, especially when they are planned to prevent pest problems.

Organic and Fluoride

However, this would not be *Pesticides and You* if we did not illustrate some of the challenges that we face in making our environment safer for all its inhabitants. So, we publish a piece by Ellen and Paul Connett in which they document the serious health problems associated with fluoride, its widespread use in food production and drinking water, and provisions that permit its application under the new National Organic Standards. Fluoride has been tied to damage in the bones of the elderly, and interference with the functioning of the brain, thyroid gland, pineal gland, kidney, and the reproduction system.

The *Organic Foods Production Act* (OFPA), and the new standards released in December, 2000, offer consumers and the public an important set of minimum standards regarding process and outcome under the definition and labeling of organic food. It also provides a process, through the National Organic Standards Board (NOSB), to continue discussing controversial materials, such as fluoride, under the process of defining acceptable (and unacceptable) materials in organic farming systems.

The Connetts, pointing out the public's desire for pure food when purchasing organic, identify a weakness in the new rule that can be corrected with public input and pressure. The standards mistakenly accept categories of so-called "inert" ingredients, defined under the *Federal Insecticide, Fungicide and Rodenticide Act* (FIFRA), as acceptable materials in organic production. Inert ingredients, a term of art in the law, can be biologically and chemically active and harmful in their own right. They are treated as trade secret information by the EPA. It just so happens that sodium fluoride is listed as a List 4B inert ingredient by EPA (see *Lists of Other (Inert) Pesticide Ingredients* on EPA's website, www.epa.gov/opprd001/inerts/lists.html) or "Inerts which have sufficient data to substantiate they can be used safely in pesticide products." The trouble with this approach, of course, is that the safety standard in the pesticide law is much weaker and less protective than the standard in the organic law. To infer adequate regulatory review and protective standards under FIFRA for purposes of implementing OFPA is certainly a mistake. Once down this road, other problems suddenly appear, such as the other "inert" that the Connetts identify, bone meal. The Connetts tell us that fluoride concentrates in the bones of all mammals and, they say, we can expect concentrations to be in the 1000 ppm plus range.

It continues to be important to bring these concerns forward to the NOSB and, as the Connetts suggest, to effect changes in practices where use of fluoride can be reduced or eliminated.

Let there be no mistake, chemical-intensive practices in conventional agricultural systems incorporate polluting practices that also result in fluoride contamination and other pollution problems of a magnitude that far exceeds organic practices. Nevertheless, as consumers and farmers seek to improve and purify organic practices, we must face the challenges raised by Ellen and Paul Connett's article and others.

War on Weeds

This issue also provides the background for a problem that is taking on greater seriousness as pressure builds to use pesticides in the battle against weeds, or invasive species, across the country. David Pimentel's article outlines the serious economic and environmental implications of invasive species. We cannot ignore this issue. At the same time, it is foolish to assume that the solution is pesticide-dependent, as many (or most) weed managers seem to think. Related to this problem, is the growing use of the herbicide glyphosate, Roundup™, which we review in this issue because of serious concerns about the weed killer's adverse impact on human health and the environment.

In a note to the Commissioners of Boulder County, CO in February, Professor Tim Seastedt from the University of Colorado said, "I do believe I have a sustainable long-term, ecologically friendly, extremely cost-effective solution for diffuse knapweed." Tim is using insects, primarily a little weevil called *Larinus minutus*, as a form of biocontrol. "In mid June, I predict that the bolting knapweed at the site will be "dying on the vine" prior to flowering due to the abundance of the biocontrol insects."

Global Climate Change

We brought global climate change to the pages of this magazine last issue as part of our focus on the causes of pest problems in the design of prevention strategies. If, in fact, we will see, among other things, an increase in public health pesticide use in our communities as a result of early global climate change, the problem merits our attention. We are including in this issue a schematic entitled "Weather and West Nile Virus" to further this discussion.

Please plan to attend our 19th National Pesticide Forum and 20th Anniversary Celebration this year. We'll see you in Boulder, CO, May 18-20, 2001.

— Jay Feldman is executive director of Beyond Pesticides/NCAMP

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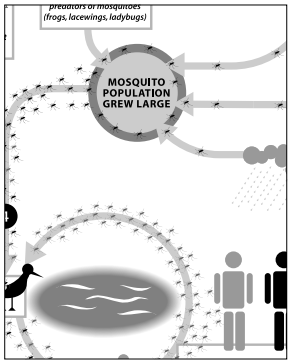

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Tucson Community's First Victory Against Pesticides

Dear Beyond Pesticides/NCAMP,
At last night's board meeting, I made a motion: "To adopt a NO CHEMICAL policy for our community on all public and common grounds; to utilize our 'pesticide budget' to pull weeds, if needed, throughout 2001; to review this policy and its effectiveness on the landscape and on our budget at the November 2001 board meeting, when we will work on the 2002 budget." The motion passed 4-3. (To show you the magnitude on our annual association budget, the "Pesticide Budget" was going to be: $3,200 for surflan, possibly $2,000 to "water in" the surflan, plus an unknown figure for "insecticides as needed.")

I am very proud to say, "The Presidio at Williams Centre HOA now has a 'Chemical Policy.' That policy is NOT to use ANY chemicals on our public or common grounds." This means that our community will NOT be applying ANY PESTICIDES inside the community and along the two streets that we maintain that border our community.

Thank you for providing me with valuable information about the toxicity of pesticides and the many available alternatives, including Integrated Pest Management (IPM). Our small win means that every individual can make a difference and that these efforts do work. Let's all continue to think out of the box and work together for what's right and good!
Jeffrey LaNuez
Presidio at Williams Centre HOA
Tucson, Arizona

Dear Mr. LaNuez,
Congratulations on your victory! Unfortunately, many people do not realize that there are effective and economical alternatives to controlling pests in the home, yard, schools, and throughout entire communities. Educating the public about the hazards of pesticide use and the available alternatives is the first and most important step in moving away from pesticide dependency. The development of a solid pesticide policy that defines acceptable pest management practices is also essential, and you have achieved both. Your win could be the beginning of an even larger movement. Through your victory, others will come to understand the dangers of pesticide use, be made aware of the effectiveness of the alternatives available, and will work to do the same within their own communities. Thank you for letting us know about your great accomplishment. We are so glad that Beyond Pesticides/NCAMP was able to provide you with information to help you in your fight for a safe, healthy, pesticide-free community. Contact Beyond Pesticides/NCAMP for a Community Toolkit and learn how to organize in your area ($12 ppd).

Effects of In-utero Pesticide Exposure

Dear Beyond Pesticides/NCAMP,
Recently I read, "A 1993 study of Missouri children revealed a statistically significant correlation between childhood brain cancer and use of various pesticides in the home" (*Environmental Science*, 6th Edition, G. Tyler Miller Jr.). This information really caught my attention because I am pregnant. I looked over many warning statements on home pesticides and found that, though the labels clearly stated to keep away from children, they said nothing about the effects on pregnant women. Shouldn't a pregnant woman also avoid pesticides?

Without a warning label to pregnant women, it is clearly stating to me that it is safe for a pregnant woman to use or be around pesticides. Since everything a woman eats, drinks, or inhales is shared with the life inside of her, wouldn't the inhalation of pesticides affect her fetus?
April Pinedo
Ontario, Canada

Dear Ms. Pinedo,
It is extremely important to avoid pesticide use and exposure while pregnant, and to protect your children from exposure, as they are much more susceptible to the adverse effects of the chemicals. The labeling requirements on pesticides are inadequate, and many people assume that, because the U.S. Environmental Protection Agency (EPA) has approved a product and its label does not carry specific warnings, it must be safe. No pesticide is safe, especially for pregnant or nursing mothers and children. The Office of Pesticide Programs of EPA has stated that, "where possible, persons who potentially are sensitive, such as pregnant women and infants (less than 2-years old), should avoid any unnecessary pesticide exposure" (EPA, 1995, Desk Statement). According to Environmental Science & Technology *(Volume 15, Number 6, June 1981), "In 1969, scientists reported that DDT, DDE, lindane, dieldrin, and heptachlorepoxide were present in cord blood (fetal) and tissues of 10 stillborn infants, in levels equal to that of adults. This confirms the transplacental transfer of these compounds, which we now know can also reach the newborn via breast milk." A study of the Yaqui, an indigenous group living and working in the Yaqui Valley of Sonora, Mexico, showed that those living in the high pesticide use agricultural community of the valley had an increased risk of problem pregnancies when compared to those living in the non-agricultural foothills, which avoids pesticide use (18.3% compared to 7.5%), with a 4.6% rate of spontaneous abortion, 6.4% rate of premature birth, 4.6% rate of birth defect, and 2.8% rate of stillbirth in the valley and a 3.8% rate of spontaneous abortion, 3.7% rate of premature birth, and 0% rate of both birth defects and stillbirth in the foothills. The study also found that foothill children had more stamina, were more capable of catching a ball, were better able to drop a raisin into a bottle cap, had better recall abilities with 30-minute memories, and*

were significantly more capable of drawing a person. (Guillette, E., et al., An Anthropological Approach to the Evaluation of Preschool Children Exposed to Pesticides in Mexico, Environmental Health Perspectives, 106(6): pp. 347-53.) The study, "Environmental Pollutants in Meconium in Townsville, Australia," by I. Deuble, et al., of the Department of Neonatology, Kirwinwas Hospital for Women in Townsville, Australia, and Department of Pediatrics, Wayne State University, Michigan, collected 44 meconium samples from August 1998 to November 1998, and found that an average of three different pesticides was found in each meconium sample. The study linked lindane exposure to low birth weight and found that, though DDT has not been available in Australia since 1981, lindane since 1985, and chlordane since 1995, these pesticides can still be found in the food chain and can be passed from the mother to the fetus.

For more information about pesticides and pregnancy, or pesticides and children's health, contact Beyond Pesticides/NCAMP.

Wood Preservative Exposure Causes Ill Effects

Dear Beyond Pesticides/NCAMP,
I work as a lineman for a utility company. Recently I encountered a small amount of methylisothiocyanate while sawing off a treated pole. I was never told that I should avoid the vials of the chemical that were installed in the poles. My nose and eyes burned and watered, and I developed a very bad headache. I did go to the hospital, but they only washed out my eyes and gave me a painkiller for my headache. I would like some information about the possible side effects of exposure to this chemical.
Rick Drenning
via email

Dear Mr. Drenning,
Methylisothiocyanate (MITC) is a wood preservative pesticide used to control wood rot and decay-causing fungi. (It is also the breakdown product of metam sodium; a total biocide and the third most widely used agricultural pesticide in the U.S. by volume.) MITC-FUME is the only MITC wood-preservative product currently registered by the U.S. Environmental Protection Agency (EPA), registered in 1987 for the treatment of large structural timbers (utility poles, pilings and bridge timbers) and laminated wood products. It is applied to in-use wood utility poles in a closed delivery system, using pre-measured dosages in aluminum tubes. The vial containing MITC is placed into a pre-drilled hole in the utility pole, and the hole is then plugged. MITC is corrosive to the skin and eyes, can be highly toxic if absorbed through the skin, and can cause a skin rash. Both acute exposure to MITC at high air concentrations and exposure to levels too low to smell for a period of several hours can cause burning eyes, headaches, nausea, throat irritation, breathing difficulties, and fainting. In laboratory studies, MITC reduced fetal growth of pregnant rabbits, affected the sex hormone levels in rats when injected, and was toxic to the immune system, causing decreased thymus weight and a decrease in the number of immature lymphocytes. EPA, however, has not classified MITC as either a carcinogen or a reproductive toxicant. According to EPA, the two studies performed did not find increased cancer rates, but they used inadequate dose levels, causing inaccurate test results. MITC is considered very highly toxic to fish and aquatic invertebrates.

On July 15, 1991, a railroad car overturned and dumped 19,500 gallons of metam sodium into the Sacramento River. Metam sodium breaks down into MITC within 1 to 5 hours of exposure to water. The spill killed everything in its 7-mile path from the Sacramento River to Lake Shasta, California's largest reservoir, effectively wiping out one of the most productive stretches of fishing water in California.

MITC is currently being reviewed through EPA's Pesticide Reregistration Program. Anyone who suffers side effects from exposure to a pesticide should see their doctor immediately, file a written complaint with their state and regional EPA offices, and contact Beyond Pesticides/NCAMP for chemical information and a Pesticide Incident Report (PIR). We will add your report to those already sent in by others and use them to provide testimony in support of reforming the nation's pesticide policies and practices. They will provide a strong foundation upon which we can build the case for reform.

For information about the hazards of wood preservatives, contact Beyond Pesticides/NCAMP for a copy of Poison Poles or Pole Pollution *($22ppd, $7ppd), or see our website at www.beyondpesticides.org and click on either* Poison Poles *or* Pole Pollution *under the reports heading. For information about others who have been injured by exposure to wood preservatives, see Beyond Pesticides/NCAMP's newsletter* Pesticides and You, *volume 20, number 2.*

Write Us!

Whether you love us, hate us or just want to speak your mind, we want to hear from you. All mail must have a day time phone and verifiable address. Space is limited so some mail may not be printed. Mail that is printed will be edited for length and clarity. Please address your mail to:

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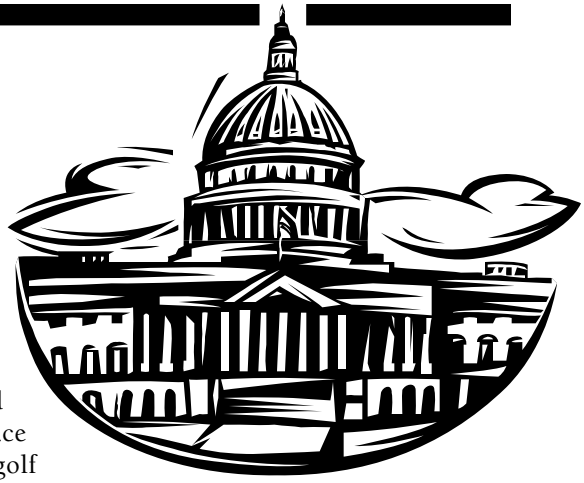
Controversial Choices Named to George W. Bush Cabinet

George W. Bush, who now occupies the Oval Office, has concerned environmentalists with his choice of several cabinet members, including former New Jersey Governor Christie Todd Whitman, Administrator of the Environmental Protection Agency (EPA); former California Department of Agriculture Secretary Ann Veneman, Secretary of the US Department of Agriculture (USDA); and, former Colorado Attorney General Gale Norton, Secretary of the Interior. Each of these cabinet members has the power to influence national pesticide policies.



Christie Todd Whitman, EPA Administrator — Considered by many environmentalists to be the least controversial of the three cabinet choices, former New Jersey Governor Christie Todd Whitman was confirmed as EPA Administrator on January 31, 2001. The *New York Times* reported that many environmental scientists and advocates consider Ms. Whitman "the best they could hope for under a Republican administration." Fred Krupp, executive director of Environmental Defense and a member of the Administration's EPA transition team, told the *New York Times* that Ms. Whitman would be a very positive appointment. "In every administration, there are always voices on the other sides of these issues. Given the stature that she walks in with, and her record in New Jersey, we're hopeful that she would not be afraid to be an independent voice to make the environmental case." However, other environmentalists criticized the Governor's record in New Jersey. Jane Nogaki, pesticides organizer of the New Jersey Environmental Federation said that while the governor has shown improvement on open space issues, on hard pollution issues, including water and air quality, Ms. Whitman receives at best a "D" or an "F."

During her first term as governor, Christie Todd Whitman cut the New Jersey Department of Environmental Protection enforcement budget by 30%. As a result, there were fewer inspections, and enforcement penalties dropped 80%. She also cut 2000 chemicals from the state's Right-to-Know workplace reporting list. Ms. Whitman's record did improve slightly during her second term when she protected nearly one million acres of open space and halted the construction of a golf course in Liberty State Park. But overall, New Jersey environmentalists say her minuses outweigh the pluses. During her two terms as governor, she eliminated the Environmental Prosecutor at the state and county levels, weakened state oversight of pesticide use and failed to implement farmworker health and safety protections, attempted to repeal the state's *Clean Water Enforcement Act*, weakened the state's hazardous waste program, eliminated community involvement in brownfield cleanup programs, and failed to adequately monitor water pollution in the state, which led to EPA-imposed sanctions.

Ann Veneman, Secretary of Agriculture — Ann Veneman is a lawyer with a record of defending large agribusiness. She sat on the board of trustees for a leading biotechnology corporation. During her term as California Secretary of Agriculture (1995-1999), she opposed measures to curb the use of dangerous pesticides. Now, following Senate confirmation on February 4, 2001, Ann Veneman is leading the USDA. Previously, Ms. Veneman served as USDA deputy secretary under Presidents Ronald Reagan and George Bush. According to the *New York Times*, representatives of farming, timber and mining groups applauded her selection, but environmental groups and organizations representing small farmers called Ms. Veneman a troubling choice. They point out that as a strong proponent of free-market trade and multiple-uses for public lands, she would favor a larger role for big business and a retreat from policies that have helped family farms. "My impression is that she has been quite responsive to agribusiness," Chuck Hassebrook, program director for the Center for Rural Affairs, told the *New York Times*, "What we don't know is how responsive she will be to concerns of the smaller family farmer…there was so little debate on the future of family farming."

As California's Agriculture Secretary, Ms. Veneman opposed efforts to ban methyl bromide, a toxic, ozone-depleting pesticide. When campaigning for Governor Bush in California, she told farmers and ranchers they would no longer be subjected to "unnecessary and burdensome" government environmental and safety protections under a Bush administration. Environmentalists and food safety advocates voiced concerns over Ms. Veneman's stance on genetic engineering, given her position on the board of the Calgene Corporation, a biotechnology company actively involved with producing genetically modified ag-

ricultural crops. As a lawyer, she also has played a major role in promoting free trade agreements without adequate environmental, safety, labor and human rights standards, such as the *North American Free Trade Agreement* (NAFTA).

Gale Norton, Secretary of the Interior — On January 31, 2001, the Senate confirmed former Colorado Attorney General Gale Norton to head the Department of the Interior. According to the *Associated Press* (*AP*), Ms. Norton favors the government paying landowners for losses incurred through government regulations that limit the use of the landowner's property in order to protect wetlands or endangered species. In 1989, as a senior fellow at the Pacific Research Institute, Ms. Norton stated, "Compensation provides fairness to the person who is harmed by… government action and causes bureaucrats to examine what effect their regulations will have on their budget." She has also argued that if there is a "reasonable right to use our property… we might even go so far as to recognize a homesteading right to pollute or make noise in an area." Ms. Norton has also recommended voluntary compliance, which allows polluters to avoid legal trouble if they turn themselves in and clean up the polluted area.

According to the *AP*, Gail Norton is listed as a lobbyist for NL Industries with the Colorado Legislature. NL Industries, formerly known as National Lead Co., based in Houston, Texas, is listed as a defendant in at least 14 federal environmental and personal injury lawsuits filed over the past two years. The cases involve Superfund or other toxic waste sites, plus class-action lawsuits filed by people poisoned by lead paint. Prior to her appointment, Ms. Norton was employed with a law firm, Brownstein Hyatt & Farber, which lobbies for 45 clients in Washington, some with political interests before the Interior Department. Pesticide activists are particularly concerned about the influence the Secretary of Interior will have on the control of invasive plant species. The use of herbicides for the control of noxious weeds currently accounts for one of the nation's top pesticide uses. At the time of her Senate confirmation, over 200 environmental organizations had officially opposed Ms. Norton's nomination.

USDA Announces New National Organic Standards

The wait is over! Over ten years after the signing of the *1990 Organic Foods Production Act* (OFPA), U.S. Department of Agriculture (USDA) Secretary Dan Glickman, before he left office, announced the Final National Organic Program Rule, the national standards for the production, handling and processing of organically grown food in the United States. USDA released a proposed organic rule in October 1998, but it was met with much criticism and sparked an unprecedented 325,603 public comments. USDA proposed allowing bioengineered crops, sewage sludge, and irradiation, which became known as the "big three," under the definition of organic. The proposal was then reissued in March 2000 without the "big three." After another round of review, the final rule was released December 20, 2000, with the following changes: the new rule increases the minimum percentage of organic ingredients in products labeled "Made with Organic Ingredients" from 50% to 70%; products labeled "Organic" must contain 95% organic ingredients by weight and not incorporate background levels of pesticides that exceed 5% of EPA residue tolerance standards; and 100% organic products may be labeled as such. Consumer advocates and farmers are concerned that the difference between products labeled "organic" and "100% organic" will be lost on the consumers, and are urging that anything less than 100% be labeled as such.

At a press conference held in a Washington, DC Fresh Fields (Whole Foods) Supermarket, Senator Patrick Leahy (D-Vermont), author of OFPA, said he felt like a proud father and was optimistic about the opportunities the rule would bring to organic farmers. "Today will long be remembered as the certified beginning of the next growth phase of American organic agriculture," said Senator Leahy. While it is generally agreed that the final rule is an improvement over the proposed rule, many organic farmers and environmentalists offered some criticism. According to organic farmer Eric Kindberg of Ripplebrook Farms, Fairfield, IA, problems with the final version include: the use of synthetic materials in farm and livestock production that are prohibited under OFPA (OFPA mandates that no synthetic substances can contact or be an ingredient of organic processed products); exclusion for restaurants and retail food services that are processing food, labeling and selling it as organic from being certified; a one time dairy herd exception from the requirement that cattle must be fed organically produced feed for 12 months prior to selling organic milk and dairy products; and no provision for the public to access OFPA mandated certification documents, even though OFPA indicates that the public should have access to these documents. Under the "organic" label, the rule categorically allows conventionally produced products to be substituted for organically produced ingredients in up to 5% of the product, unless an organic version becomes commercially available. USDA plans to define "commercially available" in future standard setting. *For a copy of the Final National Organic Program Rule visit the National Organic Program website at* www.ams.usda.gov/nop *or call (202) 512-1800 ask for* Federal Register, *Vol. 65, No. 246, December 21, 2000. For more information contact Beyond Pesticides/NCAMP.*

Gender Bending Pesticides May Reverse Sex in Endangered Salmon

Prior to the 1960's, it was said that Pacific Northwest salmon populations were so great, you could cross the Columbia River on their backs. Today, such a tale is hard to believe, considering that only five thousand of the original 15 million salmon return to spawn in the Columbia River basin. In the 1990's, five species of Northwest salmon were placed on the Endangered Species list. Aside from dams, which experts estimate kill over 80% of young migrating salmon, these endangered fish must also contend with the toxic and possibly sex-altering properties of pesticides contaminating their aquatic habitat. According to a study, "High Incidence of a Male-Specific Genetic Marker in Phenotypic Female Chinook Salmon from the Columbia River," published in the January 2001 edition of *Environmental Health Perspectives* (Vol. 109, No. 1), 84% of the endangered wild chinook salmon phenotypic females that returned to spawn in the Columbia River had a genetic marker found only on the Y (male) chromosome. As in humans, sex in salmon is determined chromosomally: females are XX and males are XY. The authors, from the University of Idaho and Washington State University, tested for the presence of a genetic marker present only in XY individuals. Under normal circumstances, an individual with this genetic marker would grow up male. This suggests that 84% of the wild Chinook salmon females in the Columbia River were sex-reversed, creating the potential for an abnormal YY genotype in the wild that would produce all-male offspring and alter sex ratios significantly. Because none of the hatchery-raised salmon sampled demonstrated this abnormality, the researchers believe the sex reversal is most likely due to the unnaturally high water temperatures induced by dams in the Columbia River basin, endocrine disrupting chemicals, including pesticides, that pollute the Columbia River, or a combination of both factors.

This is not the first time chemically-induced feminized male fish have been documented in the wild. The feminization of male fish by endrocrine disrupting chemicals was first discovered by English researchers in the early 1990's (Donaldson, et al., 1991). According to the authors, because estrogen is the principal endocrine regulator in the ovaries of female fish, an estrogen-sensitive "window" occurs around the time of hatching and extends beyond the time when these fish begin to feed exogenously. During this window, male chinook salmon have been shown to be very susceptible to sex reversal. Dr. Donaldson's studies have shown that male salmon can be sex reversed by exposure to high concentrations of synthetic estrogen for periods as short as one hour. After exogenous feeding has begun, sex reversal can be induced only by chronic exposure, typically accomplished by feeding food containing estrogens.

On January 30, 2001, the Northwest Coalition for Alternatives to Pesticides (NCAP) and the Washington Toxics Coalition (WTC), along with commercial fishermen and legal counsel from the Earth Justice Legal Defense Fund, filed a lawsuit against the Environmental Protection Agency (EPA) for failure to protect threatened and endangered salmon and steelhead from pesticides. According to NCAP, for more than nine years, EPA has violated the legal mandate to consult with the National Marine Fisheries Service (NMFS) on steps to protect salmon. The *Endangered Species Act* requires that federal agencies adopt procedures to insure that their actions do not threaten listed species. The lawsuit asks that EPA: consult with NMFS to evaluate existing threats to salmon and eliminate these hazards; take immediate protective actions, such as restrictions on pesticide use near water; and, use all its programs, such as water quality standards under the *Clean Water Act*, to protect the endangered salmon from pesticides. "EPA can no longer evade its legal obligation to protect salmon from pesticides. EPA has to stop pesticides from getting into our streams and making it harder for salmon to survive," said Erika

Schreder, staff scientist with WTC. The U.S. Geological Survey has found concentrations of pesticides in Pacific Northwest rivers and streams at levels that are associated with negative impacts on fish growth, development, behavior, and reproduction. *For more information or a copy of the salmon sex-reversal study (3 pp), send $2 to Beyond Pesticides/NCAMP. For more information on the lawsuit contact NCAP, 541-344-5044 or WTC, 206-632-1545.*

Poor Colombian Farmers Poisoned by U.S. Coca Eradication Program

The latest U.S. attack in the so-called "War On Drugs" is putting thousands of civilian lives and a fragile Columbian ecosystem in great danger. On December 22, 2000, the Colombian military, funded by over $1 billion in U.S. aid, began a new phase of aerial pesticide spraying aimed at eradicating coca crops, the plant from which cocaine is manufactured. While previous efforts have been aimed at large scale coca operations in remote regions of Columbia, the new campaign, called *Plan Columbia*, uses helicopters to douse poor farming communities with the herbicide RoundUp™, a top-selling product of the Monsanto Corporation. According to *The Washington Post*, the targeted communities are being punished for not cooperating with the U.S. government. Local residents affected by *Plan Columbia* claim the campaign, which has covered their towns and farmhouses with pesticides, has induced fevers in local farmers. They also blame the pesticides for the deaths of fish and livestock. Many Columbians deny the charge that the U.S. is targeting uncooperative coca farmers. "Those without coca are more affected than those with it," Hiberto Soto Vargas, a local farmer whose banana grove was fumigated, told *The Washington Post*. "All of this is dying now," he said, pointing to his fields. "All of it."

Colombian farmers predict widespread hunger if the program continues as scheduled. They urge the government to stop the program immediately. Despite local warnings, the U.S. has pledged another $1.3 billion over the next two years, mostly to supply military helicopters used in the aerial fumigation. "This spraying campaign is equivalent to the Agent Orange devastation of Vietnam - a disturbance the wildlife and natural ecosystems have never recovered from," Dr. David Olson, director of the World Wildlife Fund's conservation science program, told *Environmental News Service*. "And it is occurring on the watch of the current Congress and Administration, supported by taxpayer dollars."

RoundUp™, which contains the active ingredient glyphosate and hazardous inert ingredients, is a known skin and eye irritant, and causes elevated blood pressure, numbness and heart palpitations. Studies have shown medium and long term toxicity, genetic damage, reproductive effects and carcinogenicity *(see pages 16-17 in this issue)*. Farmers exposed to the chemical have shown increased risk of miscarriages, premature birth and non-Hodgkins lymphoma. *For more information on the dangers of Round-Up or US-sponsored drug eradication pesticide spray programs, contact Beyond Pesticides/NCAMP.*

Illinois Schools Disregard State Pesticide Laws, Survey Finds Many Schools Pose Risks to Children

According to a recent survey, children in almost one-third of Illinois schools are routinely exposed to potentially harmful pesticides, despite state laws requiring schools to limit children's exposure to pesticides and mandatory integrated pest management (IPM) programs. Even among the schools that said they are or will be practicing IPM, more than 50 percent are still regularly spraying pesticides or could not identify the most basic aspects of integrated pest management. Schools continue to regularly use pesticides despite increasing evidence linking pesticides to health problems, including the organophosphate pesticides chlorpyrifos and diazinon, which are currently being phased-out of the market under manufacturer agreements with EPA. "Information we have collected from schools around the country has shown that chlorpyrifos and diazinon are among the most commonly used pesticides in schools," said Kagan Owens, Program Director of Beyond Pesticides/NCAMP. Both of these chemicals are known neurotoxins, and have been linked to serious health problems. *(See "EPA Announces Weak Diazinon Phase-Out,"* Pesticides and You, *Winter 2000-01).*

The Safer Pest Control Project, a nonprofit organization in Chicago, conducted the statewide survey of more than 100 Illinois public school districts to determine if school administrators fully understand IPM and if they plan

to integrate IPM into existing pest management programs. Although 78 percent of schools that responded said that they

planned to implement the pest control strategy, the survey found that only half of Illinois schools have a written plan or school board policy in place for IPM. "The fact that so many schools don't understand IPM, after the law has gone into effect, is not a good sign. School districts need to take responsibility for complying with these laws and providing a healthier environment for their students by reducing pesticide use," said Ellen Haasch, executive director of Safer Pest Control Project. Under Illinois law, public schools may apply for an IPM waiver from the Department of Health, only if they can demonstrate that IPM would cost more than traditional pest control methods. Currently, three school districts, including Chicago Public Schools, have received waivers. Most schools have not found the transition to IPM to be very costly. Laurie Bachar, Manager of Indoor Air Quality and Environmental Health and Safety at the Naperville School District, said that her district has used IPM for the past six years without an increase in cost. "IPM has not been more expensive for our district, and parents and staff are very pleased with the program."

Another recent study, *The Schooling of State Pesticide Laws – 2000*, conducted by Beyond Pesticides/NCAMP, found that state laws provide children inadequate protection from pesticide use. The study, which evaluates the laws of each of the 50 states, finds that 31 offer a limited and unsatisfactory level of protection and the other 19 offer no protection at all. Because children are especially vulnerable to pesticides, due to their developing organ systems, small size and greater intake of air, water and food relative to their weight, environmentalist argue that the federal government must adopt sufficient minimum uniform standards to protect children. *For a copy of the study (5 pp), contact the Safer Pest Control Project at (312) 641-5575. For a general information packet on pesticides and schools (25 pp), send $4, and for the* Schools, Children and Pesticides: Adopting School Integrated Pest Management *action guide (130 pp), send $15 to Beyond Pesticides/NCAMP.*

Study Shows Adverse Effects on the Immune System Associated with Living Near a Pesticide Dump Site

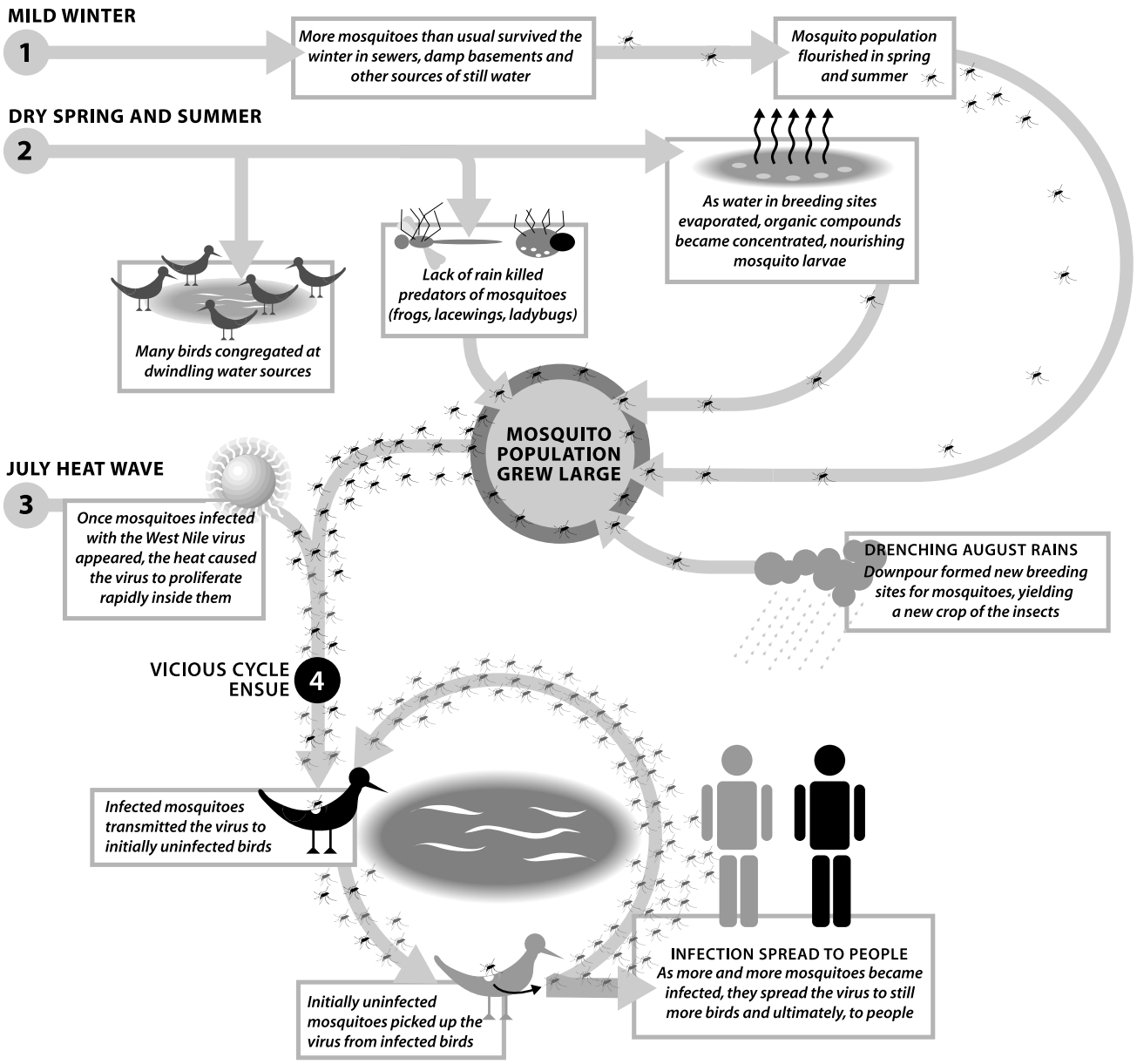
A study, "Effects on the Immune System Associated with Living Near a Pesticide Dump Site," published in the December

2000 edition of *Environmental Health Perspectives* (Vol. 108, No. 12), shows that residents living near a pesticide dump site in Aberdeen, North Carolina experience higher levels of pesticide plasma contamination and adverse effects on the immune system than residents in neighboring communities. The study, conducted by researchers at the University of North Carolina, was designed as a part of a larger study to evaluate effects on the immune system of residents living near a pesticide dumpsite, now a federal Superfund site. In 1990, EPA determined that the soil and groundwater at the dumpsite had been contaminated with a variety of organochlorine pesticides, volatile organic compounds and metals. About the same time, three Aberdeen municipal wells were shut down due to contamination with the organochlorine pesticide lindane. The Aberdeen dumpsite is officially composed of six sites located in and around the North Carolina town. The six sites include two former pesticide manufacturing and formulating facilities, two pesticide disposal sites, a local landfill, and an old sandmining pit into which pesticides and drums were dumped.

As part of the study, each of 302 residents of Aberdeen and neighboring communities provided a blood specimen, underwent a skin test, and answered a questionnaire. Blood specimens were analyzed for organochlorine pesticides, immune markers, and micronuclei. DDE, a breakdown product of DDT, was detected in the blood in a significant number of participants. Residents who lived within a mile of any site had higher plasma DDE levels than residents who lived farther away. Residents who lived near the manufacturing facility while it was still producing pesticide products also had higher plasma DDE levels than those who lived in the area after it was shut down. Overall, residents who lived closer to the dumpsites also experienced effects on the immune system, including decreased mitogen-induced lymphoproliferative activity. *For a copy of the study (12 pp), send $3 to Beyond Pesticides/NCAMP.*

Weather and the West Nile Virus

If, in fact, we will see, among other things, an increase in public health pesticide use in our communities as a result of early global climate changes, the problem merits our attention. This diagram offers a possible explanation for how a warming trend and sequential weather extremes helped the West Nile virus to establish itself in the New York City area in 1999. Whether the virus entered the U.S. via mosquitoes, birds or people is unknown. But once it arrived, interactions between mosquitoes and birds amplified its proliferation.



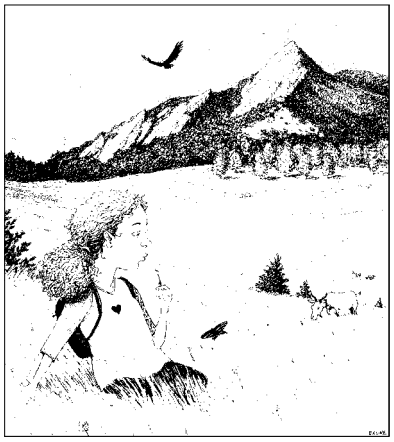
Economic and Environmental Impacts of Invasive Species and Their Management

by David Pimentel, Ph.D.

[Editor's Note: Historically, in response to an invasion of weeds, people have turned to toxic chemicals like glyphosate, an herbicide covered in our chemWATCH factsheet on pages 16 and 17 of this issue of *Pesticides and You*. The use of pesticides compounds the ecological and economic damage caused by invasive species addressed in the following piece by David Pimentel – pesticides poison our soil, air, water and bodies. Elected officials and regulators are beginning to appreciate the hazards associated with allowing a continued flow of invasive species into the U.S. and the use of pesticides to control them. For example, Executive Order 13112, signed by President Clinton on February 3, 1999, called for federal agencies to prevent, monitor, and control invasive species while researching control technologies and educating the public. Beyond Pesticides/NCAMP, and many others in the environmental community, recognize that much more needs to be done to protect public and environmental health, as well as the economic well-being of the users of the land, in the face of the growing problem of invasive species. More than ever we must move toward ecologically sound integrated weed management. Join us at our 19th annual National Pesticide Forum, May 18-20, 2001 in Boulder, Colorado. One major focus of the conference is ecological management of open space. Come to learn what you can do to make a difference in your community.]

More than 50,000 species of plants, animals, and microbes have been introduced into the United States and they cause damages totaling $137 billion per year. Invasive species predation and competition are the prime causes of native species populations declining and 42% are being placed on the threatened and endangered species list.

Approximately 5,000 species of introduced plants have escaped and now exist in agriculture and U.S. natural ecosystems. Some of the nonindigenous plants have become established and have displaced several native plant species. Non-native weeds are spreading and invading approximately 1.8 million acres of U.S. wildlife habitat per year. For example, the European purple loosestrife (*Lythrum salicaria*), which was introduced in the early 19th century as an ornamental plant and from seeds in the ballast of ships, has been spreading at a rate of about 300,000 acres per year and is changing the basic structure of most wetlands that it has invaded.



Sometimes, a non-native plant species competitively overruns an entire ecosystem. For example, in California, yellowstar thistle (*Centaurea solstitialis*) now dominates more than 10 million acres of northern California grassland, resulting in the total loss of this once productive grassland. Similarly, cheatgrass brome (*Bromus tectorum*) is dramatically changing the vegetation and fauna of many natural ecosystems in the west. This annual grass has invaded and spread throughout the shrub-steppe habitat of the Great Basin in Idaho and Utah, predisposing the invaded habitat to fires. Before the invasion of cheatgrass, fires burned once every 60 to 110 years and shrubs had a chance to become well established. Now, the occurrence of fires once every three to five years has led to a decrease in shrubs and other vegetation and to the occurrence of competitive monocultures of cheatgrass on more than 12 million acres. The animals dependent on the shrubs and other original vegetation have been reduced or eliminated.

An estimated 138 non-native tree and shrub species have invaded native U.S. forest and shrub ecosystems. These introduced trees include salt cedar (*Tamarix spp.*), eucalyptus (*Eucalyptus spp.*), Bazilian pepper (*Schinus terebinthifolius*), and the Australian melaleuca tree (*Melaleuca quinquenervia*). Some of these trees have displaced native trees, shrubs, and other vegetation and populations have been reduced. Of course, the animals dependent on the trees, shrubs, and other original vegetation have been reduced or eliminated.

Weeds are also a serious problem in crops, including forage crops. Approximately 73% of the weed species in crop systems are non-native. Each year weeds destroy about 12% of all potential crop production despite all controls. The invading weeds cause more than $23 billion per year and about $3 billion is spent on herbicides in an attempt to control invasive weeds. Thus, the total annual cost of introduced weeds to the U.S. agricultural economy is more than $26 billion.

According to former Interior Secretary Bruce Babbitt, ranchers spend approximately $5 billion each year to control invasive non-native weeds in pastures and rangelands; nevertheless, these weeds continue to spread in the wildlands.

An estimated 4,500 insect and mite species have been introduced into the United States. Approximately 1,000 non-native insect and mite species are crop pests. Each year, pest insects destroy approximately 13% of potential U.S. crop production despite all controls. An estimated 40% of the insect pests were introduced into the United States. It is estimated that introduced insect pests cause nearly $14 billion in U.S. crop losses each year. This estimate is conservative because it does not include the environmental costs of using insecticides and miticides or any of the increased crop losses that these exotic pests may cause. In addition, approximately $1.2 billion worth of pesticides are applied for control of all crop insects and mites each year in the United States. The portion applied against non-native insects

and mite pests is about $500 million per year. Thus, the total cost for the introduced non-native insect and mite pests is approximately $14.5 billion per year.

An introduced insect that is causing significant economic and environmental problems is the fire ant. A conservative estimate is that the fire ant causes from $1 to $2 billion in damages in the United States annually.

There are an estimated 50,000 parasitic and nonparsitic diseases of plants in the United States, most of which are caused by fungi. In addition, more than 1,300 species of viruses are plant pests in the United States. Many of these microbes are non-native and were introduced inadvertently with seeds and other parts of host plants (that were themselves introduced deliberately) and have become major crop pests. Including the introduced plant pathogens plus other soil microbes, it is conservatively estimated that more than 20,000 species of microbes have invaded the United States.

Because about 65% of all plant pathogens are introduced species, it is estimated that approximately $21 billion of crop losses are attributable to non-native plant pathogens. In addition, growers spend about $500 million per year on fungicides to combat the introduced plant pathogens. Thus, the total damage and control costs of non-native plant pathogens amount to about $21.5 billion per year.

Two vertebrate pests that are causing significant damages to agriculture and other parts of the US economy are rats and feral pigs. There are an estimated 1.25 billion rats in the United States and they cause at least $19 billion in damages each year. In addition, there are more than 4 million feral pigs in the U.S. and these animals cause at least $1 billion in damages each year.

Once an invasive species becomes well established in the United States, it is practically impossible to exterminate the pest. In fact, in 99.99% of the cases the invading species are here to stay and we must invest in control operations for those that are causing serious problems.

The best approach to dealing with invasive species is to increase efforts to prevent them from invading the nation in the first place. One of the best approaches to prevention is to educate the public concerning the risks of bringing exotic plants and animals into the United States.

David Pimentel, Ph.D., holds a joint appointment in the Department of Entomology and the Section of Ecology and Systematics at Cornell University and is a member of the Graduate Fields of Ecology and Evolutionary Biology, Entomology, and Natural Resources. His research spans the field of basic population ecology, genetics, ecological and economic aspects of pest control, biological control, energy use and conservation, genetic engineering, sustainable agriculture, soil and water conservation, and natural resource management and environmental policy. A more complete version of Dr. Pimentel's article can be found in "Environmental and economic costs of nonindigenous species in the United States," BioScience *2000. 50(1): 53-65.*

Additional Readings

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Pimentel, D. "Environmental and economic effects of reducing pesticide use in agriculture." *Agriculture, Ecosystems & Environment* 1993. 46(1/4): 273-288.

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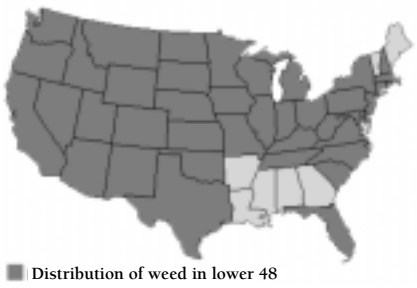
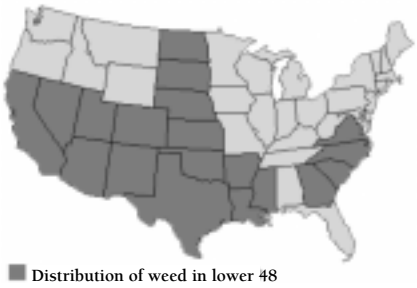
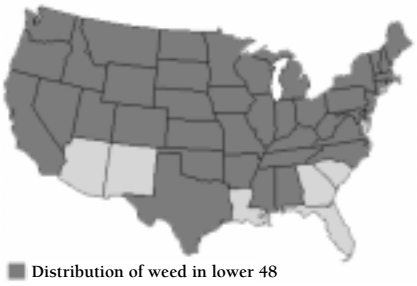
YELLOW STAR-THISTLE *(CENTAUREA SOLSTITIALIS)*



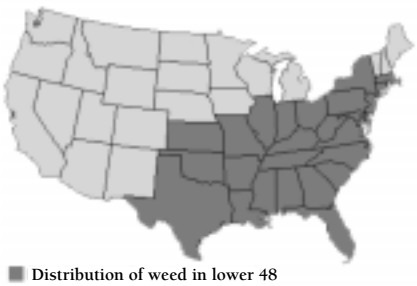
PURPLE LOOSESTRIFE *(LYTHRUM SALICARIA)*



SALTCEDAR *(TAMARIX RAMOSISSIMA)*



KUDZU *(PUERARIA MONTANA)*



Source: USDA, NRCS 1999. The PLANTS database (http://plants.usda.gov/plants).National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Planning for Planting

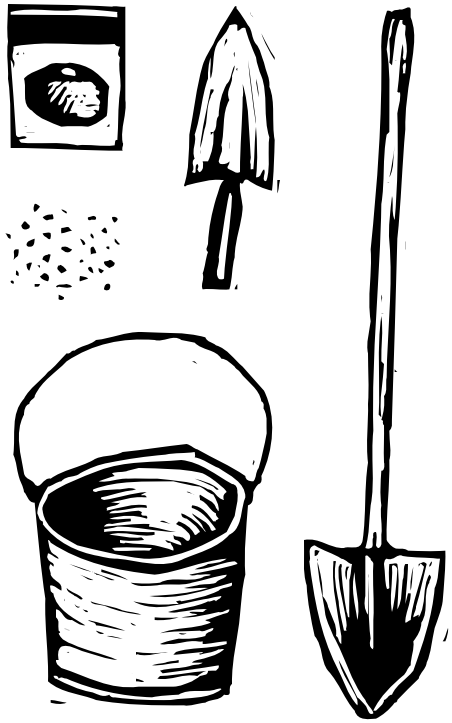
How to Plan Your Organic Garden

by Becky Crouse

Whether you are an experienced gardener or you have finally decided that you are ready to graduate from window boxes, planting a garden requires planning. A properly planned and planted garden will naturally resist disease, deter insect pests, and be healthy and hardy. With the spring planting season fast approaching, winter is the ideal time to get started.

Set Goals

What do you want to do with your plot of earth this season? Begin planning by setting goals. Grab your garden map, a pencil, your gardening guide, catalogs, and your thinking cap. List the areas of your yard and garden separately (i.e. lawn, vegetable patch, flower garden), and, keeping in mind the size and conditions of your site, brainstorm! Are you planning a garden for the first time? Do you want to expand your existing garden? Did you have pest or disease problems last year that you're hoping to prevent this year?



What map? To create a map of your yard or garden, measure the dimensions of your site as a whole, and then the individual dimensions of your vegetable patch, flowerbeds, and lawn. It's easiest to draw your map to scale on a sheet of graph paper. These measurements will be necessary later, when you are determining how much of a plant or seeds to buy. Once the map is drawn, write in any information you know about soil characteristics, drainage, environmental conditions (sunny, shady, windy), and the names of trees and perennial plants that already exist. Your map will let you know exactly what you have to work with, and will give you a realistic idea of problems that need attention or features you'd like to change or add.

Gardening 101. It is important to understand the magnitude of your project before you begin. Getting the background information necessary to fulfill your goals may take an hour or a week, depending upon your level of experience and how involved you plan to get. Consulting your garden guidebook is a great way to begin — I suggest Warren Schultz's *The Organic Suburbanite*, *The New Organic Grower* by Eliot Coleman, Rodale's *Chemical-Free Yard & Garden*, or *The Handy Garden Answer Book* by Karen Troshynski-Thomas. You can also go to your local library and investigate their resources or contact your local garden club for their suggestions. As you research, write down how long each project will take, what tools you will need, and the approximate cost of everything you will need. This information will be invaluable when you make up your shopping list and schedule of activities.

Scheduling and Organization. A schedule of activities lists what you hope to accomplish in what time frame. It will help keep you on track. It is important to be realistic about what you are capable of. Your friends may call you the Zucchini God or the Queen of Phlox, but that doesn't mean that you can create or revamp your garden in a week. Staggering your major tasks over time will make them easier to accomplish and save you the frustration of looming unfinished projects.

Planning for the long term will aid in your organization. You can create a year-by-year schedule that maps out a time frame in which to achieve your big goals. Obviously, the schedule can change as time goes by, you learn new methods and you rethink your objectives, but maintaining focus on what you hope to create in the long term can keep you motivated on what you are doing now.

Tool Tutorial

You have a plan! You have knowledge! Do you have tools? Chances are you may be able to obtain most tools at your local lawn and garden store. Bring the list that you assembled in Gardening 101, and, if you are a seasoned gardener, assume that the same pests and plagues will be back that you dealt with last year and buy your supplies now. If you are new to the gardening scene, buy the basic tools that you will need, and then nose around the neighborhood and perhaps your local gardening club to see what is recommended for what you are planting and where you live.

BASICS:

- Diggers – You will need a spading fork for aerating your soil and turning your compost pile. Look for a spading

fork with rectangular, flat blades. A manure fork may also be compost-pile friendly when it comes to turning.

- Weeders – Weeding tools include hoes and short-handled cultivating tools. Both are made in a variety of styles, and you will probably want more than one of each. Standard hoe types include:
  - Swan-neck hoe – The curved neck positions the cutting blade to skim just below the surface, making it ideal for light work around garden crops.
  - Oscillating hoe – Also called a scuffle hoe or hula, it has a hinged, double-edged blade that barely disturbs the soil surface, minimizing the number of new weeds brought to the surface.
  - Collinear hoe – Designed by Eliot Coleman, the narrow blade and angled handle are useful for cutting off small weeds with little soil disturbance.
  - Eye hoe – Also called a grub hoe, the heavy blade is for hard chopping at tough, overgrown weeds.
- Standard short-handled cultivating tools:
  - Hand cultivator – A tined tool, useful for disturbing the soil surface around close planting to uproot young weeds.
  - Dandelion weeder – Made for uprooting weeds with long taproots.
  - Pavement weeder – A trowel for removing weeds in cracks of stone slab or brick walkways.
- Pruners – Pruning trees and shrubs promotes growth and good health, and pruning out diseased wood helps to control disease problems. Pruning tools come in varying sizes depending on your need. Choose a sharp, high quality pruning tool.
- Tillers – Tillers will also range in size, depending on the job. There are large, gas-powered tillers for breaking ground or big jobs, and small tillers that are lightweight and are useful for cultivating around perennials. Rent a few tillers to try them out before buying, as they do differ a great deal and can be expensive.
- Sowers – Wheeled seeding tools that have changeable interior disks for different seed sizes and spacings are available and very handy if you are planting large areas.
- Comfort tools – There is a plethora of comfort-oriented garden accessories available on the market today. Products range from gloves, to kneepads, to small, wheeled benches/carts. It is up to you to decide what will suit your needs, if you need any at all.

Starting From Seed

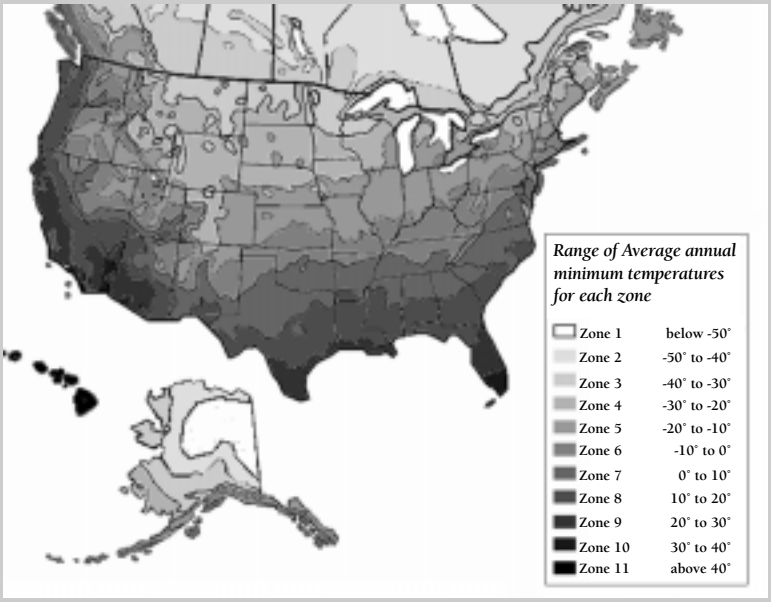
Starting your plants from seed will ensure that they are chemical free. Most transplants sold in garden centers have been treated with chemical fertilizers or pesticides. Seeds themselves bought at garden centers may be coated in fungicides, so be very careful about what you buy or buy from an organic seed supplier.

To start plants from seed, you need sterile soil, sterile planting containers, and labels. It is better to grow each seedling in a separate container to avoid the damage incurred by ripping roots apart, and to make for a less shocking transplant.

If you purchase soil mix, be sure that it is sterile to avoid spreading disease to your seedlings. To make your own mix, use vermiculite (a mica-based mineral that has been heated to make it expand to many times its original size), perlite (volcanic ash that has been heated and 'popped'), and sphagnum (moss that has been collected while still alive, dried, and then finely ground). Add 1 tablespoon of lime for each 2 quarts of sphagnum that you use to counteract its acidity. Good recipes for soil mix are 1 part sphagnum and 1 part vermiculite, or 1 part each sphagnum, vermiculite and perlite.

Seeds actually need heat, not light, to germinate. The heat from a grow light or sunny window may be enough for some, but placing the containers on top of a warm refrigerator or on a seed-starting heating pad may be necessary. Keep your seeds moist by planting them in moist mix and covering them with plastic wrap. As soon as you see the first sign of life, remove the wrap and place them someplace where they will receive 8-10 hours of sunlight per day. Water them care-

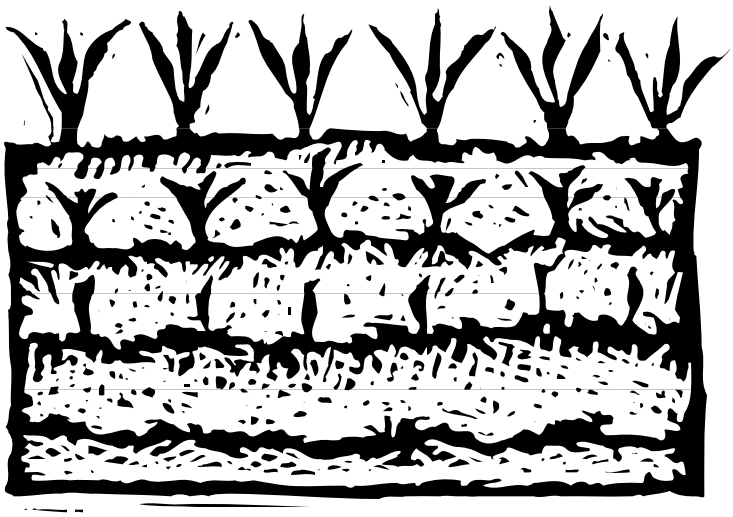
USDA Plant Hardiness Zone Map



Source: USDA, http://www.usda.gov

fully with a spray mister, careful not to knock the seedlings over or wash away the soil.

Before you transplant your seedlings outdoors, they need to be acclimated to the different climate. Bring them outside and place them in a sheltered, somewhat shady spot for a few hours each day, gradually increasing their exposure to the elements over a week or two.



Plants have a hardiness zone, an area based on the average annual low temperatures where a plant is most likely to withstand the region's annual low temperature. The U.S. Department of Agriculture (USDA) has produced a map that breaks the U.S. into 11 zones. Growing plants that are outside your hardiness zone is not impossible, but they will need special attention. When deciding what to plant, consult a hardiness zone map to come up with plants that are most likely to thrive in your zone (see map).

Garden Design

Switching to chemical-free gardening will not only mean changing your gardening practices, but also your gardening design. Gardening in beds, as opposed to rows, provides for better weed, disease and pest management. Beds are also more attractive and easier to maintain.

In a garden bed, everything is planted within arm's reach. The leaves of adjacent plants shade the soil, reducing weed growth. Diversity in a garden bed also has many advantages. A variety of plants in a mixed bed provide some natural pest protection by making it difficult for pests to find and eat their target plants, or helping to attract insects that are beneficial to your garden and prey on pest insects. It also reduces the chances that pests and disease organisms will build to epidemic levels, as they won't be able to hop from tasty host to tasty host, as they would if you had planted in rows. Your soil will also reap the benefits of your diverse planting techniques. A good example is planting nitrogen-gobbling corn with nitrogen-giving beans. Pairing up particular plants or planting in variety can help the soil maintain its nutrient balance, ensuring happier plants and a better crop yield. In fact, this technique even has a name — companion planting.

Companion Planting. Much of the science of companion planting is figuring out what works for you. Many books can give you guidelines about what plants work well together. Some plants are attractants, some repellents, some can be interplanted with your crops and flowers, and some compete too vigorously and should be planted in separate borders or hedgerows. For example, sunflowers are a good border plant, attracting lacewings and parasitic wasps; radishes are good to interplant because they repel the striped cucumber beetle; and marigolds are good to both use as a border and interplant, as they attract hover flies and repel root nematodes, Mexican bean beetles, aphids, and Colorado potato beetles. It can be confusing, and not all plants work well together. Your best bet is to start simple, determine what pests you encounter, and work from there, altering the plants in your garden bed as needed from year to year. Often, a mixture of flowers, vegetables and herbs work well together in a single bed. For a good guide to the basics of companion planting, consult Rodale's *Successful Organic Gardening: Companion Planting*.

Making your bed. Making your bed can be as simple as marking off 3-by-5-foot sections of garden with pathways left between them. However, to optimize the advantages of planting in garden beds, raise your beds. Raised beds provide lighter, deeper, more nutrient-rich, water absorbent soil. Raised beds, however, must be regarded as permanent in order to maintain their splendor. They cannot be walked on or broken down at the end of the season. You can build sides on your bed with bricks, rocks, or cedar 2-by-4 or 2-by-six planks to maintain the shape instead of raking and reshaping the bed every year. Stay away from pressure-treated wood, as it is treated with wood preservatives that are harmful to you and the environment.

How do you achieve raised beds? With double-digging, of course! (This is also known as hard work.)

Double-digging raised beds.

1. Dig out the top one-foot of soil along one end of the bed. Keep the soil in a wheelbarrow or on a groundcloth.
2. Loosen the exposed subsoil by thrusting in a spading fork and twisting its tines back and forth. For extra benefit, add a small amount of organic matter and work it in as you loosen that subsoil.
3. Once the subsoil is loosened, move over and begin removing the topsoil from the next strip of garden bed. This time, instead of keeping the topsoil that you are removing, shovel it over the subsoil to which you have just added the organic matter. You can add a little more organic matter to the topsoil as you shovel.
4. Repeat step 3.

5. When you have reached the last row of your garden bed, use the reserved topsoil to cover the last area of exposed subsoil.
6. Plant!

Composting

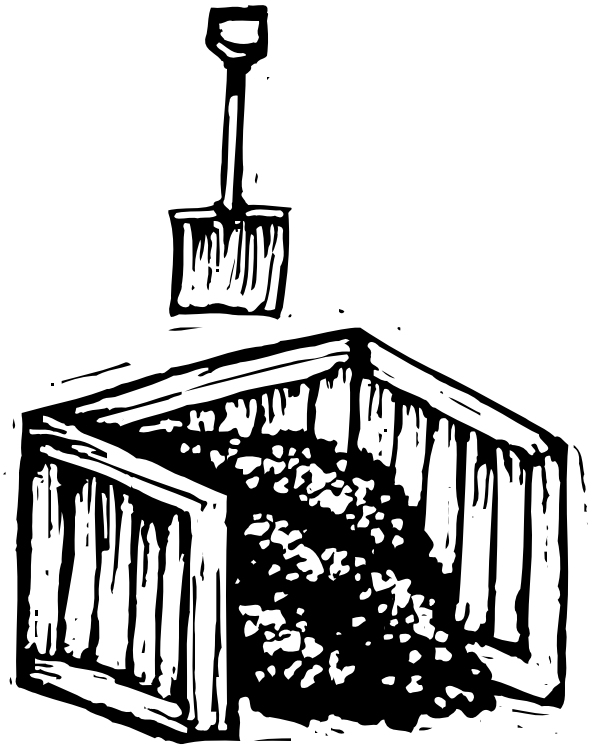
Compost is a great fertilizer and can aid in pest prevention. Compost is created when microorganisms, earthworms and nematodes consume and breakdown organic matter into simpler compounds. This process happens more quickly in an active compost pile because these microorganisms have the required heat, air and moisture, and a diverse supply of raw materials to digest. An active pile requires turning every week to add oxygen and keep the decomposition rate high; a passive pile is a pile of organic matter left to decay over time — usually in one to two years.

Whichever method of composting you choose, the first step is making a compost pile. You can layer the materials in a heap, set up a heavy chicken wire frame (this works well for a passive pile), build wooden or concrete-block bins, or buy a commercially made bin to hold your pile. Some commercial bins have built in rotating turners that will make your job much easier. The ideal size for an active compost pile is 4 feet by 4 feet, though size can vary.

Choose a location that is shady and well drained for your pile. Clear away any surface cover at the site, loosen the soil with a spading fork, and put down a layer of wood chips or brush as a base. You can toss in garden or kitchen wastes, grass clippings, newspaper, manure, and sawdust. Avoid adding kitchen waste that is heavy in oil and meat products. Shredded materials make better compost more quickly. Try to alternate layers of plant material (chopped leaves or straw) with nitrogen-rich materials (kitchen scraps with manure and blood meal). Keep your pile moist, at a similar level to a squeezed-out sponge, and keep open piles covered with a tarp or heavy canvas so that they won't become waterlogged in the rain. If your pile becomes too dry, add water with kelp extract to moisten it and stimulate biotic activity. Turn your active pile regularly, mixing and loosening the materials with a spading fork, to prevent overheating and keep microorganisms happy and active. Ideal active compost temperature should be within 140° to 150°, or at slightly higher temperatures if you are composting diseased plant material, around 160°.

Your organic compost pile will yield rich humus that will be an ideal fertilizer to your garden. It will save you the money of buying commercial, synthetic fertilizers, many of which have shown to contain toxic waste. Healthy soil makes for hardy plants.

Planning your garden can be the most important thing you do this growing season. With a solid plan in place and established goals, you can minimize your pest problems and potential frustration, and maximize your growing season, your garden's beauty, and your free time to spend swinging in the hammock. Isn't that what it's supposed to be about?



For more information about organic gardening and least-toxic weed and pest control, contact Beyond Pesticides/NCAMP.

SUPPLIERS:

- **Seeds of Change**, 888-762-7333, www.seedsofchange.com
- **Gardener's Supply Company**, 128 Intervale Road, Burlington, VT 05401, 888-833-1412, 800-551-6712 (fax), www.gardeners.com
- **Harmony Farm Supply and Nursery**, 3244 Highway 116 North, Sebastopol, CA 95472, 707-823-9125, 707-823-1724 (fax), www.harmonyfarm.com
- **Peaceful Valley Farm Supply**, P.O. Box 2209, Grass Valley, CA 95949, 888-784-1722, www.groworganic.com
- **Gardeners Alive**, 5100 Schenley Place, Lawrenceburg, IN 47025, 812-537-8650, 812-537-5108 (fax), www.gardensalive.com

NOTE: Beyond Pesticides/NCAMP does not necessarily endorse all products sold by the above suppliers. Please read descriptions carefully when purchasing products.

RESOURCES:

Bradley, Fern M., ed. Chemical-Free Yard & Garden, Eamus: Rodale, 1991.

Troshynski-Thomas, Karen, The Handy Garden Answer Book, Detroit: Visible Ink, 1999.

GLYPHOSATE

Despite widespread use of the weed killer glyphosate, and the prevalent myth that it is harmless, this pesti-cide is tied to acute human health effects and linked to non-Hodgkin's lymphoma. It is found in two Monsanto products available over the counter, Roundup™ and Rodeo™, making glyphosate one of the most widely used and well-known herbicides on the market. If there is one pesticide that represents the "fast-food," quick-fix generation, glyphosate would likely be it – the McPesticide of toxic chemicals.

General Use

Glyphosate (N-phosphono-methyl glycine), according to the Environmental Protection Agency's (EPA) most recent data on pesticide usage, was the seventh most widely used active ingredient in agriculture, with 34 to 38 million pounds used in 1997.[1] In 1995/96, glyphosate ranked as the second most used active ingredient in non-agricultural settings, with five to seven million pounds used in the home and garden market and nine to twelve million pounds used in commercial settings.[2] Glyphosate use is currently growing at a rate of about 20 percent per year, due in large part to the growing number of genetically engineered crops that are resistant to the herbicide.[3] With this growth rate, it is estimated that as much as 100 million pounds of glyphosate was applied in 2000. Of course these numbers fail to reflect the poundage of inert ingredients in the formulations that are mixed with the glyphosate.

First registered for use in 1974, there are 63 glyphosate-containing pesticide formulations registered for use in the U.S. The isopropylamine salt of glyphosate, the active ingredient in 53 of these products, is used to kill a variety of broadleaf weeds and grasses. The principal agricultural uses include corn, wheat, sorghum, citrus and stone fruits, potatoes, onions, asparagus, coffee, peanuts and pineapple.[4] There are also a good number of non-food uses including ornamental, turf, forestry and rights-of-way.[5]

Some of the most widespread uses of glyphosate that have been attracting public attention include use in invasive weed management and home gardening.

The increase of glyphosate use in these areas is directly tied to the larger problem of poor land management, including over grazing, over development, soil compaction and other stressors. Glyphosate has replaced ecologically sound and sustainable cultural practices such as green-mulching, and preventive maintenance such as aeration and dethatching.

Mode of Herbicidal Action

Plants treated with glyphosate translocate the systemic herbicide to their roots, shoot regions and fruit, where it interferes with the plant's ability to form aromatic amino acids necessary for protein synthesis. Treated plants generally die in two to three days. Because plants absorb glyphosate it cannot be completely removed by washing or peeling produce or by milling, baking or brewing grains. It has been shown to persist in food products for up to two years.[6]

Inert Ingredients in Glyphosate Formulations

A letter published in the Feburary 6, 1988 *Lancet* (page 299) cited a Japanese report of 56 cases of toxic exposure to Roundup™ between June 1984 and March 1986. The individuals had ingested the pesticide, and experienced a range of adverse effects to their respiratory, cardovascular, and central nervous systems; nine patients died. An analysis of the findings identified one of the so-called "inert ingredients" (inerts) in the formulation, polyoxyethyleneamine (POEA), as the cause of harm. POEA is a surfactant, a chemical added to help glyphosate work its way into the plant tissue. Roundup™ contains 15% POEA.

All pesticide formulations are actually toxic soups, a mixture of the active ingredient (the registered pesticide) with a variety of other chemicals such as solvents, surfactants (like POEA), and emulsifiers – the inerts. Federal law classifies inerts as trade secrets and pesticide manufactures are not required to list inert ingredients on the pesticide label. Inerts, which can make up as much as 99% of a pesticide formulation, are often highly toxic chemicals that can be more hazardous than the active ingredient.

Inerts known to be included in glyphosate products include ammonium sulfate, benziothiazolone, 3-iodo-2-propynl butylcarbamate (IPBC), isobutane, methyl pyrrolidinone, pelargonic acid, sodium sulfite, sorbic acid, and isopropylamine. All of these chemicals are associated with skin irritation, gastric and respiratory problems.[7]

Acute Exposure to Glyphosate

While EPA considers glyphosate to be "of relatively low oral and dermal acute toxicity,"[8] the agency does classify glyphosate in toxicity class II (class I chemicals are the most toxic in a scale from I-IV). Some glyphosate products are of higher acute toxicity, primarily due to eye and/or skin irritation.

The most recent data (1998) from California's Department of Pesticide Regulation finds that glyphosate ranks first among herbicides as the highest cause of pesticide-induced illness or injury to people in California.[9] Beyond Pesticides' own pesticide incident reporting system has received numerous reports of people poisoned by exposure to glyphosate from around the country. These victims of pesticide exposure suffered from eye soreness, headaches, diarrhea, and other flu-like symptoms.

Symptoms following exposure to glyphosate formulations include: swollen eyes, face and joints; facial numbness; burning and/or itching skin; blisters; rapid heart rate; elevated blood pressure; chest pains, congestion; coughing; headache; and nausea.[10]

In developmental toxicity studies using pregnant rats and rabbits, glyphosate caused treatment-related effects in high dose groups, including diarrhea, decreased body weight gain, nasal discharge and death.[11]

Chronic Exposure to Glyphosate

One reproductive study using rats found kidney effects in the high dose group, while another study showed digestive effects and decreased body weight gain.[12] A cancer study looking at rats found an increase in pancreas and liver tumors in males as well as an increase in thyroid cancer in females.[13]

A 1999 study, *A Case-Control Study of Non-Hodgkin's Lymphoma and Exposure to Pesticides,* (American Cancer Society, 1999), found that people exposed to glyphosate are 2.7 times more likely to contract non-Hodgkin's Lymphoma.

There has been controversy regarding whether glyphosate at high doses causes tumors of the thyroid and testes in rats. EPA has reported that technical glyphosate is contaminated with "less than 100 parts-per-billion" of N-nitroso-glyphosate (NNG), a by-product of synthesis. Many N-nitroso compounds are animal carcinogens. EPA is not, however, requiring further investigation of the toxicological effects of NNG, because it does not typically require data on N-nitroso contaminants present at levels of less than one part-per-million.

Environmental Effects

Much of the belief about glyphosate's environmental safety is based on the expectation that residues will be "immobile in soil," and therefore the chemical will not contaminate groundwater. EPA acknowledges that the material does have the potential to contaminate surface waters. If glyphosate reaches surface water, it is not broken down readily by water or sunlight.[14] The half-life of glyphosate in pond water ranges from 70 to 84 days.[15]

Glyphosate is moderately persistent in soil, with an average half-life of 47 days, although there are studies reporting field half lives of up to 174 days.[16] Residues of glyphosate have been known to persist for months in anaerobic soils deficient in microorganisms. Glyphosate residues are difficult to detect in environmental samples and most laboratories are not able to perform this service because of the lack of generally available, economically feasible methodology.

Effects on Nontarget Animals

Glyphosate use directly impacts a variety of nontarget animals including insects, earthworms, and fish, and indirectly impacts birds and small mammals.[17] A study conducted by the International Organization for Biological Control found that exposure to Roundup™ killed over 50 percent of three species of beneficial insects – a parasitoid wasp, a lacewing and a ladybug.[18] Repeated applications of glyphosate significantly affected the growth and survival of earthworms.[19] Studies have also shown that glyphosate, and in particular the inert ingredients in the formulation of Roundup™ are acutely toxic to fish.[20]

Alternatives to Glyphosate: Integrated Weed Management (IWM)

A good IWM program combines monitoring, proper landscape design, mulching, mechanical and cultural methods, and includes the use of heat, herbicidal soaps, and corn gluten meal. Biological control of weeds, using beneficial insects or pathogens is also an excellent approach.

For home gardeners and farmers alike, the best way to manage weeds is to prevent them. Home gardeners should make sure that their seeds are not contaminated with weed seeds and that all organic matter has been properly composted. Topsoil should also come from a reliable source.

Mulching is a great way to control weeds. A mulch is any type of material that covers the ground and precludes unwanted plants from growing. Organic mulches can be worked into the soil at the end of the season, providing valuable organic material to your garden.

Glyphosate ChemicalWATCH Factsheet References

[1] Environmental Protection Agency. 1999. *Pesticides Industry Sales and Usage: 1996 and 1997 Market Estimates.* EPA-733-R-99-001. p. 21, Table 8. <http://www.epa.gov/oppbead1/pestsales/97pestsales/97pestsales.pdf>

[2] Ibid. p. 22, Table 9.

[3] Northwest Coalition for Alternatives to Pesticides. 1998. "Herbicide Factsheet: Glyphosate (Roundup)." *Journal of Pesticide Reform* 18(3):4.

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[6] Pesticide Action Network. 1997. Glyphosate fact sheet. For more information about glyphosate visit <http://data.pesticideinfo.org/4DAction/GetRecord/PC33138>

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[8] EPA. 1993.

[9] California Pesticide Illness Surveillance Program Report – 1998. Table 4. <http://www.cdpr.ca.gov/docs/dprdocs/pisp/1998pisp.htm>

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[18] Ibid. p. 11. *Citing* Hassan, S.A. et al. 1988. Results of the fourth joint pesticide testing programme carried out by the IOBC/WPRS-Working Group "Pesticides and Beneficial Organisms." *J. Appl. Ent.* 105: 321-329.

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[20] Ibid. p. 12. *Citing* Folmar, L.C., H.O. Sanders, and A.M. Julin. 1979. "Toxicity of the herbicide glyphosate and several of its formulations to fish and aquatic invertebrates." *Arch. Environ. Contam. Toxicol.* 8: 269-278.

Fluoride: The Hidden Poison in the National Organic Standards

Asking organic farmers to adopt fluoride-free farming

by Ellen and Paul Connett, Ph.D.

[Editor's Note: This article raises serious health questions about the continued use of fluoride in food production, specifically organic farming systems, and in public water supplies. It leads to a larger discussion of allowable inert or secret product ingredients and permitted synthetic materials in organic agriculture under the national organic standards, adopted in December 2000. However, it should be noted that chemical-intensive practices in conventional agricultural systems incorporate polluting practices that also result in fluoride contamination and other pollution problems of a magnitude that far exceeds organic practices. Nevertheless, as consumers and farmers seek to improve and purify organic practices, we must face the challenges raised by Ellen and Paul Connett's article and others.]

Introduction

The U.S. Department of Agriculture's (USDA) revised rule on National Organic Standards (NOS), proposed in March 2000, was finalized in December 2000. For the most part, the standards have been written with care and integrity. For the rest, they attracted over 40,000 comments from the public. The standards were first proposed in 1997 and included proposals to use sewage sludge, irradiation, antibiotics in livestock, and genetically modified organisms. USDA withdrew the proposal after receiving over 275,000 comments from the public— the most comments received on any U.S. agency proposal in history.

In the main the public's efforts on this issue paid off well. In the final NOS the four practices listed above were out, but unfortunately, despite over 100 comments, those concerned about fluoride were ignored. Incredibly, the new standards allow the use of the toxic substance sodium fluoride in organic agriculture.

Fluoride is a persistent and non-degradable poison that accumulates in soil, plants, wildlife, and humans. Many organic farmers may be unaware that this highly toxic substance has been allowed for use in the NOS, because its presence is hidden. However, it is there:

- As Sodium Fluoride tucked away in the U.S. EPA List 4B Inerts ("Inerts which have sufficient data to substantiate they can be used safely in pesticide products, according to EPA."), which are allowed for use in the NOS.
- In Bone Meal (which can contain 1000 ppm - or more- fluoride), also included in U.S. EPA List 4A Inerts ("Inerts generally regarded as safe, i.e., corn cobs and cookie crumbs," according to EPA).

To call sodium fluoride an "inert" is Orwellian and defies one of the NOS's stated principles: producers shall not use "natural poisons such as arsenic or lead salts that have long-term effects and persist in the environment." Fluoride is clearly in this category. Sadly, the use of fluoride in organic farming could undermine the public's confidence and safety in organic food- both here and abroad. This will become more obvious as the movement against fluoridation of public water picks up momentum worldwide. As it does, more and more people will be asking questions about fluoride levels in their food. Unlike the List of Inerts, fluoride levels in organic food cannot be hidden.

Fluoride is a persistent and non-degradable poison that accumulates in soil, plants, wildlife, and humans.

The purpose of this article is to argue the case against any use of fluoride in organic agriculture in the hope that despite these new standards it will encourage organic farmers to go "fluoride free." Before we proceed we wish to note the following:

- The Agency for Toxic Substances and Disease Registry (ATSDR) stated in 1993: "Existing data indicate that subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These populations include the elderly, people with deficiencies of calcium, magnesium, and/or vitamin C, and people with cardiovascular and kidney problems... Because fluoride is ubiquitous in food and water, the potential for human exposure is substantial (ATSDR, p 112, 153)."
- The studies on which the U.S. EPA relied in establishing its maximum contaminant level (MCL) for fluoride in drinking water -4 parts per million (ppm)- and on which it has relied to perform risk assessments for fluoride pesticide residue levels were seriously flawed. Not only has the union representing professionals at EPA's Washington, DC headquarters called for an independent review of these studies, their concern led

TABLE 1

7 ppm Established Tolerances: For combined residues of the insecticidal fluorine compounds cryolite and synthetic cryolite (sodium aluminum fluoride) in or on the following:

Apricots; Beets, roots; Blackberries; Blueberries (huckleberries); Boysenberries; Broccoli; Brussels sprouts; Cabbage; Cauliflower; Citrus fruits; Collards; Cranberries; Cucumbers; Dewberries; Eggplant; Grapes; Kale; Kohlrabi; Lettuce; Loganberries; Melons; Nectarines; Peaches; Peppers; Plums (fresh prunes); Pumpkins; Radish, roots; Raspberries; Rutabaga, roots; Squash (winter); Squash (summer); Strawberries; Tomatoes; Turnip, roots; Youngberries.

them to two *unprecedented* actions. In 1986 they filed an Amicus Curiae brief in a lawsuit brought by the Natural Resources Defense Council against EPA for its MCL of 4 ppm for fluoride in drinking water. The union charged that the MCL was based on shoddy science and was not protective of public health. In 1997 the union announced its support of a citizens group fighting mandatory fluoridation in California.

- Elsewhere, we have gone into the dangers posed by water fluoridation (see "50 Reasons for Opposing Fluoridation," <http://www.fluoridealert.org>). A great deal of animal and human research, much of it published since 1990, points to fluoride's potential to damage the bones of the elderly, and interfere with the functioning of the brain, thyroid gland, pineal gland, kidney, and reproductive system.
- In 1998, a fluoride study published in *Brain Research* reported damage to rat kidneys and brain at very low doses. Rats were given 1 ppm fluoride in doubly distilled and deionized water for 52 weeks. In other words they were given the same levels as we get in fluoridated water, albeit without the other ions present in tap water. One group of rats was given aluminum-fluoride (AlF3) and another, sodium fluoride (NaF). In both cases amyloid deposits were found in the rat brains. Amyloid deposits are tangles in the brain and are associated with Alzheimer's Disease and other forms of dementia. Scientists do not know why they form. The rats in the control did not have them. The authors of the study speculate that fluoride enables aluminum to cross the blood brain barrier (Varner et al). This paper has caused quite a stir in regulatory circles and has prompted both the NIEHS and the EPA to nominate aluminum fluoride for comprehensive study by the National Toxicology Program.
- In 1994, a FDA researcher published results from a study that found an association between residence in counties with high fluoride concentrations in drinking water (3 ppm) with decreased birth rates. The author raised the question "whether public health concerns and toxicologic research should not shift their focus from the isolated intake from fluoridated water to the potential toxicity of the total fluoride intake (Freni)." This suggestion is important, because surprisingly, a great deal of the promotion of fluoridation in the U.S. has centered on the concentration of fluoride in drinking water and has been very cavalier about the total dose of fluoride we get from ALL sources.

A Little History

Fluorine is one of 92 naturally occurring elements. It is a member of the halogen family, which includes chlorine, bromine and iodine. It is a pale yellow gas which is extremely reactive. As a result it is never found free in nature but only combined with other elements. These compounds are called fluorides. Fluorine readily forms compounds with all elements except two: helium and neon. Despite being the thirteenth most abundant element in the earth's crust, it is not an essential nutrient for any living thing.

The level in human milk is 100 times lower than infant formula reconstituted with fluoridated drinking water, e.g. 0.01 ppm vs 1.0 ppm. Apart from its reaction with the calcium hydroxy apatite found in dental enamel, bone, and the pineal gland, fluorine has never been incorporated into the building blocks of living things.

The most common mineral containing fluorine is fluorspar (CaF2). It has been used for centuries as a flux in the smelting of ores and gave fluorine its name (from the Latin word fluere meaning "to flow"). Other important mineral sources of fluorine are cryolite (Na3AlF6), flurapatite (Ca5 (PO4)3.F) and other phosphate rocks.

Before World War II, fluorine could only be generated in very small quantities for experimental purposes "and could not be purchased at any price." The breakthrough to large scale production came from the work of the Manhattan Project's efforts to build the Atomic Bomb (Kirk et al). Massive quantities of fluorine were necessary to separate and concentrate the uranium isotopes

After World War II, huge quantities of fluorine have been used to produce organofluorine compounds (compounds where fluorine is attached to carbon). These include chlorinated fluorocarbons (CFCs); Teflon® (polytetrafluoroethylene), an extremely stable plastic resistent to the vast majority of chemicals including fluorine gas; and many pharmaceuticals and pesticides.

The Sources of Fluoride Getting into the Food Supply

1. Background levels of fluoride in food.

According to Waldbott et al, "Virtually every food contains at least some fluoride. Plants take it up from the soil and from the air. From the soil, fluoride is transmitted through fine hair rootlets into the stems, and some reaches the leaves. Plants absorb more fluoride from sandy than from clay soil and more from wet and acid soils than from dry and alkaline ones... (Waldbott et al, p 37)."

According to the Department of Health and Human Services (DHHS), "Fresh or unprocessed foods available in the U.S. have fluoride concentrations that generally range from 0.02 to 2.00 ppm. Marine fish that are consumed with bones and bone meal supplements have been shown to be a rich source of fluoride in human food. The bones of some land-based animals also contain high levels of fluoride (DHHS, p 10)."

2. Cooking with fluoridated water.

According to ATSDR, "Cooking food in fluoridated water results in increased dietary fluoride levels (p 151)." Approximately 60% of U.S. public drinking water supplies are fluoridated. Unlike chlorine, fluoride does not enter the steam when water is boiled. Thus during cooking the fluoride increases in concentration.

3. Processed food and beverages.

One of the unexpected results of water fluoridation was the multiplier effect caused by the processing of foods and beverages using fluoridated water. According to DHSS, "The natural food content of most foods is so small that its contribution is insignificant compared with the amount of fluoride produced through cooking and processing food in fluoridated water (p 10)." However, that comment may not have included the contribution made by pesticide residues containing fluoride.

4. Pesticides.

We have identified approximately 150 fluoridated pesticides. The three most widely used are herbicides: Trifluralin, Fluometuron and Benefin (Befluralin) (EPA, Aug 97). The category "Fluorine Insecticides" include Cryolite, Barium hexafluorosilicate, Sodium hexafluorosilicate, Sodium fluoride, and Sulfluramid.

TABLE 2

1997: Proposed tolerances for combined residues of the insecticidal fluorine compounds cryolite and synthetic cryolite (sodium aluminum fluoride) in or on the following. EPA has yet to make a decision on these proposed new tolerances.

Commodity	Current	Proposed
cabbage	7 ppm	45 ppm
citrus fruits	7 ppm	95 ppm
collards	7 ppm	35 ppm
eggplant	7 ppm	30 ppm
lettuce	7 ppm	
head		180 ppm
leaf		40 ppm
peaches	7 ppm	10 ppm
raisins	none	55 ppm
tomatoes	7 ppm	30 ppm
tomato paste	none	45 ppm

(Federal Register: August 7, 1997)

5. The use of cryolite in agriculture.

Cryolite is a naturally occurring inorganic substance; however, most present day supplies of cryolite are synthetically produced. It is used on many fruits, vegetables and ornamental crops to protect against leaf eating pests. Cryolite is formulated as dusts, wettable powders and water dispersible granulars and can be applied by ground or aerial spray. The predominant use of cryolite is on California grapes followed by potatoes and citrus.

Cryolite was first registered as a pesticide in the U.S. in 1957. Its insecticidal mode of action is predominantly as a stomach poison. Fluoride has been identified as the residue of toxicological concern (Federal Register, March 1997).

The fact that cryolite contains an aluminofluoride ion which loses fluoride ions in solution is of considerable concern. It is well established that the complex ion AlF4- is able to switch on G-proteins which are of fundamental importance in the transmission of messages from some water soluble hormones and neurotransmitters across cell membranes (Strunecka and Patocka).

California grape growers use cryolite to control two insects that can devastate vineyards. Researchers from California State University in Fresno conducted a 5 year study (1990-1994) on vineyards throughout the San Joaquin Valley. They found that "[m]ultiple applications of Cryolite during the growing season significantly increase fluoride in wines." Notably they found fluoride levels between 3 - 6 ppm in Zinfandel, Chardonnay, Cabernet Sauvignon, Chenin Blanc, Thompson Seedless, Barbera, Muscat Candi, Ruby Cabernet; and levels between 6 - <9 ppm in French Colombard and Zinfandel. They noted "that fluoride levels in wine produced from grapes not treated with Cryolite can range from 0.1 to 1.6 ppm, depending upon location and variety (Ostrom)." At 6 ppm one glass of wine (175 ml) would have delivered as much fluoride as about a liter of optimally fluoridated water!

In the 1990's a 3 ppm fluoride limit was in effect for U.S. wines exported to European Communities (EC). However, the EC recently lowered the allowable levels of fluoride in wine to 1 ppm. (Note: the vast majority of EC countries do not fluoridate their water). Responding to the potential loss of a $250 million export market, California received a time-limited residue tolerance for Tebufenozide on grapes as an alternative to cryolite. As stated in EPA's approval: "... for the 2000 crop year, nearly all major California wineries with export markets have advised their growers that they will not accept grapes which have been treated with cryolite or any other product which would affect the level of fluorides in wines. There is a direct correlation between even limited use of cryolite on wine grapes which can result in fluoride levels in wine above 3 ppm (Federal Register, July 2000)."

The current tolerance levels for cryolite on allowed crops is 7 ppm (see Table 1). In 1997 EPA proposed much higher tolerances (see Table 2). In 1997 EPA re-extended a time-limited tolerance use (up to November 21, 2001) of 22 ppm for potato waste, a processed animal feed commodity and a

2 ppm fluoride residue in or on raw potatoes (Federal Register, Dec 1997).

In our view, the current tolerance level of 7 ppm is high. The tolerances proposed in 1997 (Table 2) are exceedingly high and EPA has not made a final decision on them. What is extremely disturbing is that the proposed increases were not based on any new toxicological or health considerations but simply on the calculations by the cryolite pesticide producers of what residues were left after typical spraying operations! Instead of proposing different spraying strategies the EPA came back and proposed increasing the tolerance level. In other words the EPA is adjusting its toxicological analysis to fit industry's needs, not to protect the public health or the environment. Moroever, out of the 95 references cited in EPA's 155 page report for these tolerances, only 2 were published in the open literature. Of the two published reports, one was a 1975 paper on toxicity of chemicals to honey bees, and the second was the intensely controversial 1990 National Toxicology Program (NTP) report on fluoride's carcinogencity. The majority of the unpublished papers were submitted by the producers of cryolite pesticides (U.S. EPA, 1996).

[Sodium flouride] is obtained as a waste product from the superphosphate fertilizer industry containing other toxic contaminants . . . like arsenic, lead, and even traces of radioactive isotopes.

6. Sodium fluoride (NaF).

Sodium fluoride is used as a rodenticide and insecticide (mainly for roaches and ants), as a disinfectant for fermentation apparatus in breweries and distilleries, in wood preservation, and in rimmed steel manufacture (ATSDR, p 138). NaF is far more toxic than cryolite because it is far more soluble in water and thus more readily taken up by plants and absorbed by animals.

ATSDR states that the main use of NaF is as a drinking water additive for prevention of dental caries, but fails to point out that this is obtained as a waste product from the superphosphate fertilizer industry containing other toxic contaminants (see below).

We had requested information from USDA on the uses of NaF in organic agriculture. They have not replied. It is possible that the NaF which is allowed, like the agent used for fluoridating public drinking water, is an industrial waste product. In which case in addition to the toxicity of fluoride must be added concern about contaminants like arsenic, lead, and even traces of radioactive isotopes. This is an incredible state of affairs for something described as an "inert" in EPA's list 4 inerts included in the NOS!

7. Superphosphate fertilizer.

Phosphate rock minerals are the only significant global resources of phosphorus. Approximately 90% of phosphate rock production is used for fertilizers and animal feed supplements, which are defluorinated, and the balance for industrial chemicals (U.S. Geologic Survey, 1999).

In the U.S., phosphate rock is produced by 11 companies at 18 mines. 12 mines in Florida and 1 in North Carolina accounted for 86% of domestic production. The U.S. accounted for more than 50% of global trade of converted phosphate products.

Because phosphate rock contains considerable quantities of fluoride (up to 5%) the superphosphate industry has been a key player in fluoride pollution and exposure of people to fluoride for over a century.

Firstly, the superphosphate itself contains residual fluoride and according to a 1971 study cited by the ATSDR: "fertilization with superphosphates added to the soil 8-20 kg fluoride/hectare (ATSDR, p 146)." Phosphate fertilizers contain between one and three percent fluoride, and "fertilized tuber plants such as potatoes, beets, radishes, etc., assimilate more fluoride from the soil than from the atmosphere (Waldbott et al, p 37)."

Secondly, to prepare superphosphate, phosphate rock is heated with sulfuric acid. This results in the release of gaseous hydrogen fluoride and silicon tetrafluoride. Prior to World War II this led to considerable damage to local farmland and grazing cattle. Today, most of the hydrogen fluoride and silicon tetrafluoride are captured in wet scrubbing systems producing a solution of hexafluorosilicic acid, together with other toxic contaminants such as arsenic, lead and trace amounts of radioactive isotopes.

Thirdly, the hexafluorosilicic acid captured by the superphosphate fertilizer industry is then sold for fluoridating our public drinking water. Over 90% of the fluoridated waters systems in the U.S. use either hexafluorosilicic acid or the sodium salt made from it.

So one way or another the fluoride from the superphosphate industry enters our bodies via our food, our air or our water!

8. Powdered or raw phosphate rock.

Organic farmers and gardeners are advised to use powdered phosphate rock as a "natural" fertilizer. Unfortunately in this context, the word "natural" does not mean benign. In addition to containing 2-5% fluoride, the raw phosphate rock also contains a number of other toxic substances. The following advice is listed in our 1978 edition of *The Encyclopedia of Organic Gardening*: the use of Phosphate rock is as an "excellent source of phosphorus for fertilizer use... it contains 65 percent calcium phosphate or bone phosphate of lime as well as ... calcium, carbonate, calcium fluoride, iron oxide, iron sulfide, alumina, silica, manganese dioxide, titanium oxide, sodium, copper, chromium, magnesium, strontium, barium, lead, zinc, vanadium, boron, silver, and iodine... Phosphate rock today has been ground finer than talcum powder, so that a significant part of it is gradually available to the plant... (Rodale, p 863)."

What you can do:

Request a "Specific Prohibition" for Sodium Fluoride and Bone Meal (on EPA's List 4 Inerts) from the "National List." This is the list of approved and prohibited substances in the National Organic Standards. Petitions should be submitted to: Program Manager, USDA/AMS/TMP/NOP, Room 2945, South Building, P.O. Box 96456, Washington, DC 20090-6456.

We would add that unfortunately this means that the fluoride is also slowly available for uptake into the plants and thence into our "wholesome organic" diet.

9. Bone meal.

Another concern with organic gardening and farming is the use of bone meal, which is allowed for use in the National Organic Standards under EPA's List 4 Inerts. This meal is prepared mainly from the bones of farm animals. Fluoride concentrates in the bones of all mammals and we can expect concentrations to be in the 1000 ppm plus range. There is also the concern about transmission of Mad Cow disease through contact with bone meal.

10. Industrial air pollution.

In addition to the Superphosphate industry, discussed above, many other industries put fluoride compounds into the air, some of which ends up in our food. These include: aluminum smelters, zinc smelters, brickworks, ceramic works, steel mills, uranium enrichment facilities, coal fired power plants, and oil refineries.

"An estimated 74% of the reported fluorspar (CaF2) consumption in the United States in 1995 went into the production of hydrogen fluoride (HF) in Louisiana, Texas, and Kentucky. HF is the primary ingredient from which virtually all organic and inorganic fluorine-bearing chemicals are produced (U.S. Geologic Survey, 1997)."

In 1998, the Toxic Release Inventory (TRI) ranked Hydrofluoric Acid number 6 for Toxic Air Releases in the U.S.

Conclusion

A recent analysis of the Canadian food basket indicates that a typical North American diet delivers about 1.8 mg of fluoride per day (Dabeka, 1995). This is nearly twice the amount of fluoride one would receive from drinking one liter of fluoridated water. Some of this fluoride we can do little about, but the one source we should not have to contend with is that introduced by organic farmers. When we pay extra money to avoid pesticides, we don't expect to get doses of an extremely toxic pesticide! Thus, even though these new National Organic Standards permit organic farmers to use bone meal and sodium fluoride, we urge them not to do so. We also urge them to avoid the use of powdered phosphate rock. We urge readers to make their voices heard on this issue. In the future, we will be looking for labels that say "organic" and "fluoride free".

The National Organic Standards are available at:
www.ams.usda.gov/nop

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Draft Implementation Plan: Pesticides and National Strategies for Health Care Providers

U.S. Environmental Protection Agency (Office of Pesticide Programs, Washington, DC, July, 2000). An interagency initiative, including the U.S. Environmental Protection Agency (EPA) Office of Pesticide Programs, U.S. Department of Health and Human Services, U.S. Department of Agriculture and U.S. Department of Labor and the National Environmental Education & Training Foundation, has released a *Draft Implementation Plan: Pesticides and National Strategies for Health Care Providers*. The Plan sets out a strategic vision for improving "recognition, management, and prevention of pesticides-related health conditions." Its goal is for all primary care providers to: (i) understand the health effects associated with pesticide exposure, as well as broader environmental exposures; and, (ii) act to "ameliorate such effects through clinical and prevention activities." The Plan proposes the adoption of national guidelines and a broad outreach effort to reach health care professional associations and continuing education opportunities. The expert panel and workgroup members that developed the plan identified a three-pronged strategy for reaching the medical community through (i) education settings such as medical and nursing schools; (ii) practice settings such as community clinics, hospitals and work-place clinics; and (iii) resources and tools for dealing with pesticide-related health conditions. The Plan sets 2010 for nearly a dozen expected outcomes in these areas, including the establishment of 100 pilot primary care practices to serve as models for effectively integrating attention to health effects from pesticides in clinical, education, and or preventive ways. It also calls for a National Forum in 2001. Missing from the Plan is a mandatory national pesticide incident monitoring system (occupational pesticide poisoning reporting is called for under state workers compensation laws) that advocates have called for as a means of providing better information to regulators about the real world effects of pesticides on human health and the environment.

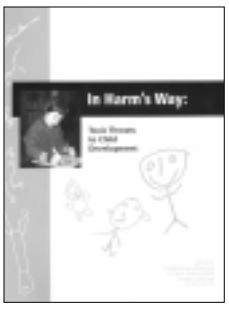
The expert panel and workgroup members did include representatives from a few environmental/health groups like the Farmworker Justice Fund and the Children's Environmental Health Network. More pesticide industry groups were represented, such as the National Pest Management Association, the American Crop Protection Association, DuPont Company, Responsible Industry for a Sound Environment and land-grant agricultural schools. A final plan was expected in Fall, 2000, but has been delayed until late Spring 2001. *For a copy, contact the National Environmental Education & Training Foundation at (202) 833-2933, ext. 535, 1707 H Street NW, Suite 900, Washington, DC 20006, www.neetf.org.*

Prairie Moon Nursery: 2001 Catalog & Cultural Guide

For those who want to restore the beauty of the native landscape and don't want to use pesticides in the process, Prairie Moon Nursery may be exactly what you're looking for. Located in Winnona, Minnesota, the nursery deals exclusively in North American native plant species for wetland, Prairie, Savanna & woodland habitats. Prairie Moon's plants are grown organically without pesticides in beds weeded by hand. Their seeds are not coated with fungicides, which are commonly used on most commercial seeds found in local nurseries.

In the Prairie Moon catalog, you will not only find pricing and product lists, but a guide to building and maintaining your native gardens or prairie habitat. Their methods for choosing and growing each plant or seed are explained, letting you know exactly what you're getting. The catalog contains a guide explaining the best time, place and soil type for each plant. Custom designed seed mixes for any number of soil types and native prairie or woodland type are available, along with a huge selection of grass, forbe, tree, cactus, shrub, vine, fern, sedge and rush seeds and plants for those who wish to design their own native garden, prairie or woodland. So, if you're interested in preserving native plant species by creating a prairie, woodland or wetland habitat, then Prairie Moon Nursery is a good place to start. *For a copy, please contact Prairie Moon Nursery by phone at (507) 452-1362, fax at (507) 454-5238, or e-mail them at pmnrsy@luminet.net. You can also order the catalog through their website at www.prairiemoonnursery.com.*

In Harm's Way: Toxic Threats to Child Development



Ted Schettler, M.D. M.P.H.; Jill Stein, M.D.; Fay Reich, PsyD.; Maria Valenti; and contributing author, David Wallinga, M.D. (Greater Boston Physicians for Social Responsibility, Cambridge, MA and the Clean Water Fund, Washington DC, 2000). *In Harm's Way*, by Greater Boston Physicians for Social Responsibility along with the Clean Water Fund, examines the correlation between exposure to environmental chemicals, such as pesticides, and the increase in developmental, learning and behavioral disabilities in children. The report describes the normal function

and development of a child's nervous system and explains why children are especially vulnerable to toxic chemical exposure and resulting neurodevelopmental disabilities. These effects, say the authors, do not lend themselves to simple medical diagnostic tests. The report, which assumes a basic science background, is an excellent resource for health care professionals, parents and others interested in childhood disabilities.

According to the report, the number of children enrolled in special education programs in the U.S., classified with learning disabilities, increased 191% from 1977-1994. Scientists are now discovering the effects of toxic chemicals on animals and humans at lower and lower levels of exposure, and various chemicals may have a cumulative effect. As of 2000, 75% of top high production and volume chemicals in this country have had little or no toxicity testing. Meanwhile, EPA estimates that approximately 28% of the 80,000 chemicals in use have potential neurotoxic effects. "The inability of the current regulatory system to protect public health is not surprising, considering the disproportionate influence of special interests in the regulatory process. When there is evidence for serious, widespread and irreversible harm, as described in this report, residual scientific uncertainties should not be used to delay precautionary actions. Actions should include reduction and or elimination of exposures as well as further scientific investigation of developmental neuroxicity." *For a copy, contact the Greater Boston Physicians for Social Responsibility at (617) 497-7440 or e-mail your order to psrmabo@igc.org. For bulk orders, there is a $10 charge for shipping and handling.* In Harm's Way *can be downloaded from their website at www.igc.org/psr/ihw.htm.*

The Healthy House: How to Buy One, How to Build One, How to Cure a Sick One

John Bower (The Healthy House Institute, Bloomington, IN, 2001). With

house hunting and building season just around the corner, it is important to be informed about what hazards you may face in the house you own, the house you intend to buy, or the house you plan to build. Mr. Bower has been promoting and practicing healthy, non-toxic construction since 1984. The fourth edition of his book, *The Healthy House,* has been revised, expanded and updated. You'll find information on anything from picking a healthy site away from agricultural chemicals and smog to the dangers of gases emitted from wall-to-wall carpeting to the toxic chemical wood preservatives, such as arsenic, contained in deck lumber. Bower explains what to watch out for from the inside out when building or buying a house and gives you cost-effective solutions for cleaning out and correcting existing health risks. The book is an incredible resource, containing the addresses, phone numbers and websites of over 600 organizations and suppliers, along with over 1,300 references for further in-depth information. Articles from fifty healthy house experts have also been added, including an article entitled "Opting for Less-Toxic Pest Control" by Beyond Pesticides/NCAMP executive director Jay Feldman.

If you're looking into buying, selling or fixing up a house, John Bower's *The Healthy House* should be your first consultant. *For a copy, order through bookstores or send $23.95 (plus $3.00 shipping, add 5% sales tax for Indiana residents) to The Healthy House Institute, 430 North Sewell Rd, Bloomington, IN 47408 or order it through the Healthy House website at www.hhinst.com. This book is also available through the Beyond Pesticides/NCAMP website (www.beyondpesticides.org) where, for no additional cost, your purchase triggers a donation to our organization.*

Pesticide Exposures in Children with non-Hodgkin's Lymphoma

Jonathan Buckley, Ph.D. et al. (Cancer 89(11):23152-2321). Researchers at the University of California Los Angeles have determined that pesticide exposure may increase a child's risk of developing cancer, specifically non-Hodgkin's lymphoma. The study, "Pesticide exposures in children with non-Hodgkin lymphoma," adds to the growing body of scientific literature linking pesticide use in the home and garden with elevated rates of childhood cancer. Dr. Jonathan Buckley and his colleagues compared the pesticide exposures of 268 children who had developed non-Hodgkin's lymphoma with the exposures of healthy children. The researchers assessed the children's and their parents' exposure to pesticides in the home one month prior to pregnancy, during pregnancy, or while nursing. According to the report published in the December 1, 2000 issue of *Cancer*, parents who used pesticides in the home once or twice a week were nearly 2.5 times as likely to have children with non-Hodgkin's lymphoma, and parents who used pesticides on a more daily basis were 7 times more likely to have children with the cancer. Elevated risks were found for both T-cell and B-cell lymphomas; for lymphoblastic, large cell, and Burkitt morphologies; and in both young (under 6 years) and older children. "The main findings suggest that pesticide exposure can cause non-Hodgkin's lymphoma, and this conclusion is supported to a certain extent by other studies on adults," Dr. Buckley told *Reuters Health*. "However, the nonspecific questions we used did not give us any detailed information about what pesticides were being used, and very little detail about how they were used." *For an information packet on pesticides and cancer (20 pp), send $3 to Beyond Pesticides/NCAMP.*

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RESOURCES

T-Shirts

❑ "Pollution Prevention Is the Cure." full color graphic on 100% natural organic cotton Beneficial-T's by Patagonia™ T-shirt. $18 each; two for $30.

❑ "Speak to the Earth, and It Shall Teach Thee." In green, blue and peach on 100% natural organic cotton. $15 each; two for $25.

❑ Tell the world that FREEDOM FROM PESTICIDES IS EVERY BODY'S RIGHT in teal, purple, and yellow. On 100% natural organic cotton. $15 each; two for $25.

Bumper Sticker

❑ "Is Your Lawn Toxic Green?" White letters on green background.

❑ FREEDOM FROM PESTICIDES IS EVERY BODY'S RIGHT. White letters on blue.

Stickers $2.00 each ($1.00 each when ordering 100+)

Books

❑ *A Failure to Protect.* Landmark study of federal government pesticide use and pest management practices. $23.00. *Summary and Overview* $5.00.

❑ *The Chemical-Free Lawn: The newest varieties and techniques to grow lush, hardy grass with no pesticides no herbicides, no chemical fertilizers.* By Warren Schultz. Published by Rodale Press. $17.95 (14.95 + $3.00 shipping).

❑ *Unnecessary Risks: The Benefit Side of the Risk-Benefit Equation.* Understand how the EPA's Risk-Benefit Analyses falsely assume the need for high-risk pesticides. Explains how "benefits" are inflated, how alternatives might be assessed, and the public's right to ask more from its regulators. $10.00.

❑ *Safety at Home: A Guide to the Hazards of Lawn and Garden Pesticides and Safer Ways to Manage Pests.* Learn more about: the toxicity of common pesticides; non-toxic lawn care; why current laws offer inadequate protection. $11.00

❑ *Voices for Pesticide Reform: The Case for Safe Practices and Sound Policy.* New study documenting stories of tragic pesticide poisoning and contamination, and successfully used alternatives that avoid toxic chemicals. $20.00

❑ *Poison Poles: Their Toxic Trail and the Safer Alternatives.* New study on largest group of pesticides, wood preservatives, and contamination associated with treated wood utility poles, and the availability of alternatives. $22.00

❑ *Toxic Deception.* By Dan Fagin, Marianne Lavelle and Center for Public Integrity. Published by Common Courage Press. $21.00

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❑ Pest Control Without Toxic Chemicals

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❑ Pesticides: Are you being poisoned without your knowledge?

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Testimony

❑ Lawn Care Chemicals, 5/9/91 $4.00

❑ FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act, 6/8/93 $4.00

❑ Food Safety, 8/2/93 $3.00

❑ National Organic Standards Board, 10/13/94 $4.00

❑ Food Quality Protection Act, 6/7/95 $4.00

❑ Parents: Right-to-Know-Schools, 3/19/97 $3.00

Other

❑ Getting Pesticides Out of Food and Food Production $5.00

❑ NCAMP's Pesticide Chemical FactSheets; individual: $2.00, book: $20.00

❑ Least Toxic Control of Pests Factsheets $6.00

❑ Community Organizing Toolkit $12.00

❑ Model Pesticide Ordinance $5.00

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19th National Pesticide Forum

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Healthy Ecosystems, Healthy Children
University of Colorado, Boulder
May 18 – 20, 2001

Beyond Pesticides/NCAMP will host our 19th National Pesticide Forum, *Beyond Pesticides: Healthy Ecosystems, Healthy Children*, May 18 - 20, 2001 at the University of Colorado in Boulder. The Forum will focus on adopting alternatives to protect children from the toxic hazards of pesticides, as well as ecological management of open space. Contact Beyond Pesticides for more information.

FEATURED SPEAKERS

HELEN CALDICOTT, MD – One of the most articulate and passionate advocates of the environmental movement, Dr. Caldicott has founded several organizations including Physicians for Social Responsibility and International Physicians for the Prevention of Nuclear War, which won the Nobel Peace Prize in 1985. She has authored several books, including *If You Love This Planet.*

MARY O'BRIEN, PHD – Dr. O'Brien is a botanist currently serving as Ecosystem Projects Director for the Science and Environmental Health Network, focusing on public interest science and implementation of the precautionary principle. Dr. O,Brien recently authored, *Making Better Environmental Decisions,* considered by many to be a handbook for the anti-toxics movement.

THEO COLBORN, PHD – Dr. Colborn is a senior scientist and director of the Wildlife and Contaminants project at the World Wildlife Fund. Her research on endocrine disruptors led to co-authorship of *Our Stolen Future.* This book shocked the public, providing evidence suggesting that human-made chemicals in the environment, including pesticides, disrupt the endocrine system.

DAVID PIMENTEL, PHD – Dr. Pimentel is one of the nation's foremost academic experts on the ecological and economic aspects of pest control. He has served as Consulting Ecologist to the White House, Chairman of the Environmental Studies Board in the National Academy of Sciences, and is on the faculty of the Departments of Entomology and Limnology at Cornell University.

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