● BASIC INFORMATION ABOUT PESTICIDES ●

WHAT IS A PESTICIDE?

By law, a pesticide is "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest." This definition includes insecticides, herbicides, fungicides, rodenticides, and antimicrobials as well as plant growth regulators, defoliants and dessicants.

It is important to note what this definition does *not* include. Pesticides kill or damage pests, but they don't solve pest problems. Solving a pest problem requires identifying the factors that allow the pest to thrive, and then changing those conditions so that the pest is no longer successful. At best, pesticides provide short-term respites from pests, and require repeated treatments to keep pest populations low.

Pesticides are unique chemicals. Designed to kill or damage living things, they are, as the National Research Council has written, "perhaps the only toxic substances that are purposefully applied to the environment."[1]

A Legal Definition

The term pesticide is defined by the national pesticide law, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). According to FIFRA, a pesticide is "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest."[2] FIFRA also adds plant growth regulators, defoliators, and desiccants to the legal definition of pesticides.[2]

"Pesticide" is commonly used as a synonym for insecticide, a substance which targets insect pests. However, under the legal definition all "cides" are pesticides: fungicides to kill molds and fungi, herbicides to kill plants, rodenticides to kill rodents, and antimicrobials for killing bacteria and viruses.[3]

What a Pesticide Is Not

A comprehensive definition of the term pesticide also needs to include what pesticides *don't* do. Pesticides kill or damage pests, sometimes very effectively. What they don't do is solve pest problems. Killing pests, in and of itself, is never the answer to a pest problem. Pest problems get solved when we figure out the causes of the problem, the factors that have allowed a pest to thrive. When these factors are addressed, a pest problem is truly solved.

John Bauguess

Simply killing pests, instead of solving pest problems, leads to routine and repeated use of pesticides as pests need to be killed over and over again. The enormous amounts of pesticides that are currently used, after decades of widespread use, are a simple demonstration of this fact. There are over 800 different pesticides and over 20,000 products currently registered for use in the U.S.; total pesticide use is over 4.5 billion pounds annually.[4] An estimated 4.4 billion applications are made annually in homes, yards, and gardens.[5]

If pesticides really solved pest problems, these enormous numbers would shrink.

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● BASIC INFORMATION ABOUT PESTICIDES ●

DOES GOVERNMENT REGISTRATION MEAN PESTICIDES ARE SAFE?

Legally, pesticides are supposed to be regulated so that they do not cause "unreasonable adverse effects" and so that there is "a reasonable certainty that no harm will result" from their use. But does this mean that pesticides, by a common-sense definition, are safe? No.

For example, consider NCAP's survey of 19 recently registered pesticides. Seven cause cancer, six cause genetic damage, one causes miscarriages, one causes birth defects, one causes cataracts, and one causes liver and kidney damage. Eight are toxic to fish, one to shrimp, and one to oysters. Five are potential groundwater contaminants. These hazards do not meet a common-sense definition of safety.

By law, pesticides are regulated by the U.S. Environmental Protection Agency (EPA) so that they "will not generally cause unreasonable adverse effects on the environment."[1] A newer federal law sets a higher standard for pesticides used on food; their residues must be "safe,"[2] defined as "a reasonable certainty that no harm will result from aggregate exposure to the pesticide."[2] But does this mean that pesticides, by a common-sense definition, are safe? No.

Pesticide regulation is full of loopholes. Many pesticides in use today were registered using old test protocols and have not yet been reevaluated under current standards.[3] Pesticide testing is performed or paid for by pesticide manufacturers,[4] setting up a built-in conflict of interest. Many tests are only "conditionally required"[5] and are often waived. Tests ignore the multiple pesticides to which people are regularly exposed because they only look at one pesticide at a time.[5]

Probably the simplest way to evaluate for ourselves whether registration means pesticides are "safe" is to look at recently registered pesticides and see if they meet a common-sense definition of safety. As newly registered pesticides, they should meet all current standards.

NCAP surveyed 19 conventional pesticides registered since 1997. EPA's evaluation of these pesticides shows most of them pose important hazards.[6] Seven cause cancer and six cause genetic damage. One causes miscarriages, one causes birth defects, one causes cataracts, one causes bone marrow abnormalities, two are neurotoxic, and one causes liver and kidney damage. Eight are toxic to fish; five to juvenile fish and three to adult fish. Five have the characteristics of groundwater contaminants. Two are highly toxic to oysters, and one to shrimp.

Clearly these pesticides are far from "safe" by any common-sense definition.

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3. FIFRA § 4.
4. FIFRA § 3(c)(1)(D).
5. 40 *Code of Federal Regulations* § 158.340.
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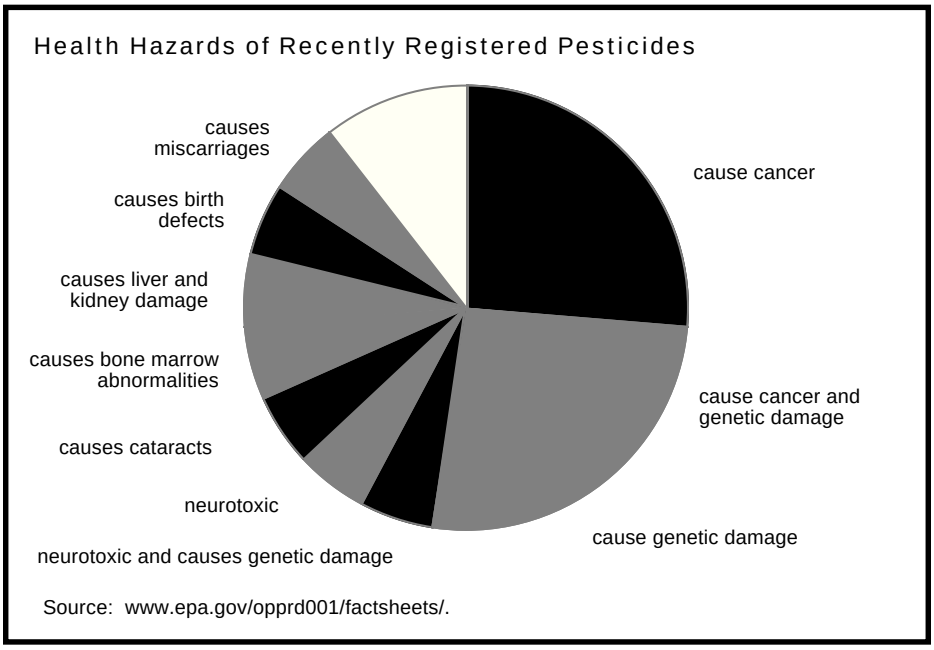


● BASIC INFORMATION ABOUT PESTICIDES ●

ARE PESTICIDES HAZARDOUS TO OUR HEALTH?

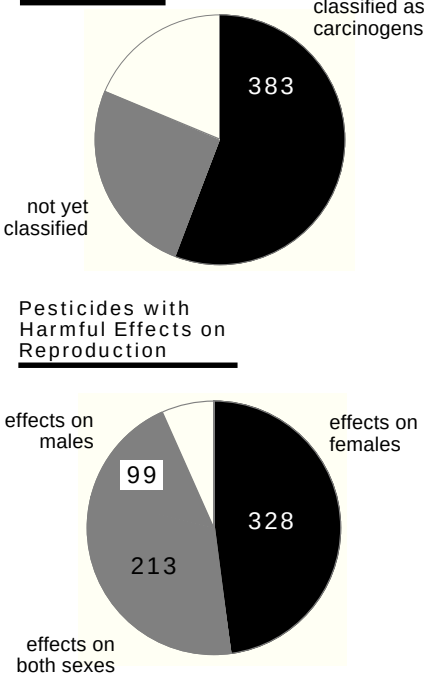
Pesticides with significant health hazards are applied in startling quantities. For example, just looking at the 26 most widely used pesticides, Americans annually apply about 380 million pounds of pesticides classified by the U.S. Environmental Protection Agency (EPA) as carcinogens. About 650 million pounds of pesticides that cause reproductive problems are used annually, with hundreds of millions of applications in our homes, on our lawns, and in our gardens.

As chemicals that are biologically active by design, it may not be surprising that pesticides can damage human health. Small amounts of some pesticides cause death;[1] others burn or irritate eyes and skin,[1] damage the nervous system,[2] disrupt our hormone[3] and immune systems,[4] reduce our ability to successfully reproduce,[3] and cause cancer.[5] What is surprising, however, are the enormous quantities of these hazardous chemicals that are used in the U.S. every year.

Pesticides and Cancer

As an example of the use of pesticides which damage our health, consider pesticides that are carcinogenic (cancer-causing). EPA is in the process of classifying pesticides based on whether or not they cause cancer in studies of laboratory animals, and so far has evaluated about 250 pesticides.[5] NCAP looked at the 26 pesticides that are most widely used in the U.S.[6,7] (This includes all pesticides with an annual use of at least six million pounds.[6]) Of these pesticides, 12 are classified as carcinogens by EPA,[5,8] with an annual use that totals 380 million pounds.[6] In other words, our dependence on chemical pest control results in 380 million pounds of carcinogenic pesticides being purposefully applied to the environment every year.

Another way of evaluating pesticides for their ability to cause cancer is to study the incidence of the disease in humans who have been exposed to particular pesticides. Such studies are called epidemiological studies. Although these studies are less common than laboratory studies, they have demonstrated associations between increased exposure to four frequently used pesticides and an increased risk of cancer.[9-18] Together, almost 190 million pounds of these four pesticides are used annually,[6] including 120 million household applications every year.[19]



Sources: References # 5-7, 18-49.

Pesticides and Our Ability to Reproduce

Pesticides have a variety of effects on reproduction. In exposed people, some pesticides cause birth defects, some cause miscarriages, some cause babies to be small, and others decrease fertility.[20-23] Reproductive effects can occur in males, females, or both. As with cancer, perhaps the most striking statistics are the sheer volume of pesticides used every year that have harmful effects on reproduction.

Looking again at the 26 most commonly used pesticides, 9 have harmful effects on male reproduction (causing sperm abnormalities, reducing sperm production, disrupting male hormones, and damaging male reproductive organs, mostly in laboratory tests).[24-33] Use of these pesticides totals over 300 million pounds per year,[6] including about 360 million household applications.[19]

Most (17) of the 26 commonly-used pesticides have caused decreased pregnancy success in laboratory tests. Miscarriages, a reduction in the number of living offspring, and reduced birth weights are common problems.[34-54] Total use of these pesticides is about 600 million pounds per year,[6] including about 330 million household applications.[17]

These examples lead to two straightforward conclusions: many pesticides pose significant hazards; and millions of pounds of these pesticides are used annually.

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DO PESTICIDES CONTAMINATE OUR RIVERS, STREAMS, AND WELLS?

Pesticides are widely found in rivers, streams, and wells. In a recent national study, the U.S. Geological Survey found that over 95 percent of river and stream samples, as well as over 50 percent of well samples contained at least one pesticide. Many samples contained multiple pesticides. Both urban and agricultural areas have pesticide-contaminated streams and rivers.

New studies show that the relatively low concentrations of pesticides found in water can affect human and animal health.

Pesticides are everywhere in our water resources and are frequently found when comprehensive surveys are made.

The best data about pesticide contamination of water come from the U.S. Geological Survey (USGS), a federal agency that is in the process of sampling river basins nationwide for pesticides. The data from the first phase of the project, encompassing 20 basins, are now available.[1]

The USGS looked for 76 pesticides and 7 pesticide degradation products. More than 95 percent of the water samples collected from streams and rivers contained at least one pesticide, as did about half of the well water samples. Mixtures of pesticides were common; over half of the stream samples contained over 5 pesticides, and about a quarter of the well samples had 2 or more pesticides.

Four common herbicides were frequently detected in agricultural areas: atrazine, metolachlor, cyanazine, and alachlor. Different herbicides were found in urban areas: simazine, prometon, 2,4-D, diuron, and tebuthiuron. Insecticides were more frequently detected in urban streams, and were rarely detected in well water. The four most commonly detected insecticides were diazinon, carbaryl, malathion, and chlorpyrifos.

Although many of the pesticide concentrations measured by the USGS are relatively low, recent studies show that these pesticides are already causing health problems for people and animals. For example, the numbers of low birth-weight babies in southern Iowa and the numbers of breast cancer cases in Kentucky were high in areas with pesticide-contaminated water.[2,3] Also, the USGS found that fish sex hormone ratios decrease with increasing pesticide contamination of rivers.[4] "Within all regions studied," the USGS concluded, fish already "may be experiencing some degree of endocrine disruption."[4] Clean water is essential for human and environmental health.

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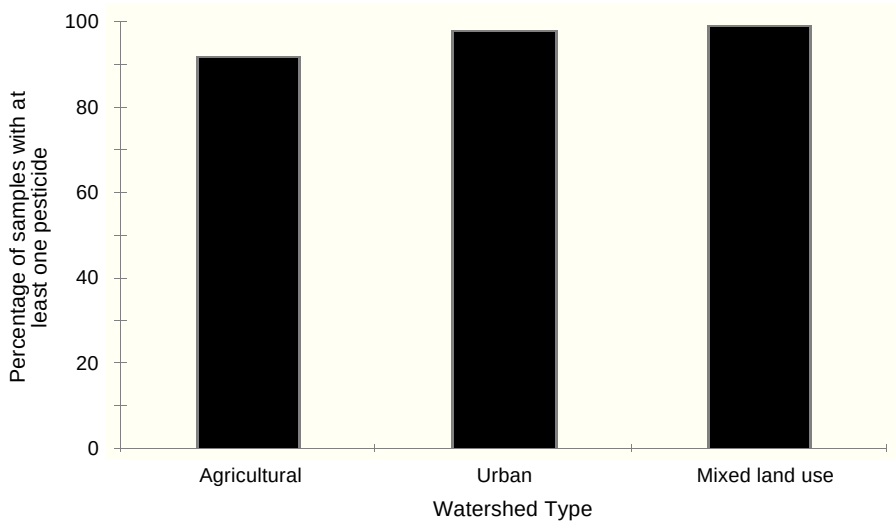
Detection of pesticides during nationwide monitoring of rivers and streams



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DO PESTICIDES POSE SPECIAL HAZARDS TO CHILDREN?

Recent research shows that pesticides are particularly hazardous for children.

Neurotoxic pesticides are a special concern. Because children's eating patterns are different from those of adults, children, for their size, eat more pesticides on their food than adults. The National Research Council estimated that every day, over a hundred thousand two-year olds consume more than our government's "acceptable levels" of a common group of neurotoxic pesticides.

In addition, children whose parents use pesticides, both in the home and on the farm, are at higher risk for certain health problems. These problems include childhood brain cancer, birth defects, miscarriages, and premature birth.

Children's special susceptibility to pesticides was first widely publicized by the National Research Council (NRC) in their 1993 report *Pesticides in the Diets of Infants and Children*. The NRC concluded that children are not adequately protected from pesticides on their food because, for their size, children consume more calories, drink more water, and eat fewer types of food than adults. The NRC recommended changes in the regulation of pesticides.[1] Many of these changes were included in a 1996 law (the Food Quality Protection Act; FQPA), but have yet to be fully implemented.

Neurotoxic Pesticides

As an example of children's vulnerability to pesticides, the NRC focused on the large and widely used family of organophosphate insecticides and noted that these pesticides share the same neurotoxic effect. They looked at two-year olds, the foods they commonly eat, and total pesticide exposure for common members of the organophosphate family. Based on this data, the NRC estimated that large numbers of children are exposed to unacceptable amounts of these pesticides: *Every day*, 45,500 American two-year olds consume organophosphates in amounts above the U.S. Environmental Protection Agency's acceptable level, and some children would consume ten times this much. When juice was included in the NRC's calculations, the number rose to 143,500 children.[1] These calculations remain valid, because the FQPA's changes have not yet been implemented for organophosphates.

Jay Sherrerd

Other Hazards to Children

Recent research has linked a wide variety of health problems in children to their parent's exposure to pesticides.

Examples include:

• A study of children with brain cancer in Los Angeles County (California) found that these children were twice as likely as children without the disease to have been exposed prenatally to flea and tick insecticides when their mothers treated their pets.[2]

• In California counties with high agricultural pesticide use, the incidence of limb reduction birth defects is also high.[3]

• In Minnesota, farmers licensed to apply pesticides on their farms are more likely to have children with birth defects. This association was particularly strong in counties with high use of fungicides and herbicides related to 2,4-D.[4]

• A study of Canadian farmers found that use of the insecticide carbaryl was associated with an increased incidence of miscarriage and the use of the herbicides atrazine and 2,4-DB was associated with an increased risk of premature birth.[5]

Taken together, these studies are a clear demonstration that pesticides' effects on children's health are a cause for concern.

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ARE "INERT" INGREDIENTS IN PESTICIDES REALLY BENIGN?

Inert ingredients are present in virtually all pesticide products. They are substances added to pesticides to make them more potent or easier to use, but their identities are often claimed as confidential and they have only minimal testing requirements.

Despite this lack of testing, many inerts pose known hazards. About a quarter of inerts have already been classified as hazardous by state, federal, and international agencies.

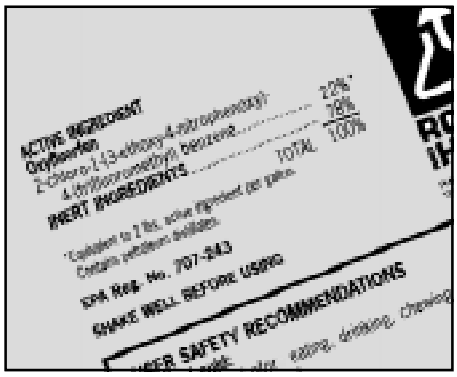
Our national pesticide law classifies pesticide ingredients into two categories, "active"[1] and "inert."[2] Active ingredients are those that are designed to kill or damage a pest.[1] Inerts are all other ingredients used in pesticide products[2] and are added to active ingredients to make the pesticide more potent or easier to use. Inert ingredients are not inert in the usual sense of the word; often they are neither chemically, biologically, nor toxicologically inert.[3]

Pesticide manufacturers claim that the identity of many inert ingredients is confidential business information and will not publicly disclose them. Under the Freedom of Information Act, the public can get information from the U.S. Environmental Protection Agency (EPA) about the inerts in a pesticide product unless the manufacturer proves that the information is confidential.[4]

Inert Hazards

Because there are only "minimal" testing requirements for inerts, EPA has little information about their hazards. Of the over 2300 substances EPA believes are used as "inerts" in pesticide products,[5] EPA classifies most (over 1700) as "of unknown toxicity"[5] because EPA's Office of Pesticide Programs does not have adequate information about their potential hazards.

However, there is clear evidence that many inerts pose significant toxicological and environmental hazards. State, federal,



and international agencies have classified 26 percent of them (about 600 chemicals) as hazardous.[6] Specific inert ingredients have well-known hazards. Examples include the following:

- Crystalline silica is a carcinogen.[7]
- Nonyl phenol ethoxylates cause destruction and marked deterioration of fish gills.[8]
- Ethylbenzene has caused fetal loss, birth defects, and testicular cancer.[9]
- Xylenes cause vomiting, impaired short-term memory, and reduced fertility.[10]
- Trimethylbenzenes cause bronchitis, fatigue, and dizziness.[11]
- Chlorofluorocarbons cause destruction of stratospheric ozone.[12]

Why Is Public Disclosure Important?

It is impossible for pesticide users, whether they are government agencies, businesses, or homeowners, to accurately understand the hazards of a pesticide product they are proposing to use if they don't know its ingredients.

"Inert" ingredients also pose a crucial ethical issue. We are all exposed to pesticides on a daily basis, whether or not we like that exposure. Given this situation, the very least we can do is to insure that we have complete, easily and publicly accessible information about all of the ingredients in pesticide products.

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