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PESTICIDES AND WATER POLLUTION: Homeowners Can Make a Difference

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Introduction

Pests have been around since the beginning of time for people, and various methods have been used to control them. Until recently, people had to tolerate lice in their clothing, worms in their food and fleas in their bedding. But throughout history, pests have brought problems far worse than these discomforts. Diseases transmitted by insects, rodents and bacteria led to deadly epidemics that wiped out millions. Famines resulted when locusts, fungi and other pests destroyed crops. Attempts to use chemicals to control pests have been made since ancient times. It wasn't until World War II however, when numerous chemicals were manufactured for military purposes, that many of the original pesticide chemicals were developed.

Over the years since WWII hundreds of basic chemicals have been created and marketed in thousands of formulations to control unwanted insects, plants, fungus growth, soil nematodes, small mammals, and other pests. The term "pesticide" is therefore applied to a variety of pest control chemicals, including; insecticides for killing "bugs", herbicides for weeds, fungicides for fungi, nematicides for nematodes, rodenticides for rodents, etc. So by their very nature pesticides are poisons - they kill things.

Over half the adult population in the U.S. uses some form of pesticide and almost everyone has physical contact with them in some form. We use them in our woodlands, fields, gardens, yards, flower beds, and around our homes and foundations for termite, roach, ant, mice, fly and other insect control. We also use them on our athletic fields, around our airports, along our roadways, waterways and rights of way and sometimes even in water bodies. We even use them on our pets and our own bodies as repellents for control of certain insects such as fleas, ticks, gnats and mosquitoes.

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The benefits of pesticides in terms of food production and control of such killing diseases as malaria and encephalitis were realized almost immediately. The total tonnage of all liquid, granular and powder forms of pesticide chemicals grew rapidly and has reached hundreds of thousands of tons, and thousands of uses for them have been devised. According to the U.S. Environmental Protection Agency (EPA), about 1.08 billion pounds of pesticides were used in the United States in 1985. About 14 per cent or 150 million pounds went into the home and garden market.

Why the Concern About Pesticides?

Science is not foolproof, and some pesticides have been used that caused environmental damage. Some of the earlier insecticides in particular, and especially the first chlorinated hydrocarbon compounds such as DDT, killed fish and also had the ability to accumulate in fatty tissues of animals. The concentrating effect of such chemicals occurred as one animal species fed on another in the food chain, and many adults now carry a low concentration of DDT in their fatty tissues. There is little evidence that DDT is harmful to humans, but adverse effects on reproduction, physiology and behavior of predator birds, fish and other wildlife species became apparent in the 1960s. For this reason DDT was banned in the U.S. in 1972 by William Ruckelhaus, the Administrator of EPA. Other chlorinated hydrocarbon insecticides and some chlorinated herbicides soon followed. In some Third World countries, however, DDT is still the pesticide of choice to kill fleas that carry the deadly bubonic plague.

We have better choices of pesticides in the U.S. today. Production and use of the more persistent insecticide chemicals has almost ceased because of environmental concerns, with newer chemical insecticide families including organophosphates, carbamates and a multitude of new herbicides on the market. Although the new chemicals are generally much less persistent than chlorinated hydrocarbons, some insecticides are more toxic and have been responsible for accidental kills of both wildlife and humans. On the other hand, newer herbicides are generally less toxic and are effective at much smaller rates than the earlier chemicals.

Until fairly recently it was believed that ground water was protected from chemical contamination by overlying soil and rock. It was thought that all pesticides were absorbed and bound to soil until they degraded; however, some chemicals are beginning to find their way into ground water and that creates much public concern. Two common pesticides were found in ground water in several states in 1979. Since then, the number has been growing. The first detailed survey by EPA from 124,000 wells in 1984 found 12 pesticides in ground water in 18 states. These numbers increased to 46 pesticides from 26 states in 1988. The latest data on EPA's National Survey of Pesticides in Drinking Water Wells was released November 13, 1990. This was the first survey of drinking water wells in the United States. The most frequently detected pesticide was a breakdown product of DCPA or dacthal, a broadleaf weed killer used primarily on lawns, but also used on a variety of fruit and vegetable crops. In this report, EPA estimated 10 percent of the nation's community drinking water wells and about four percent of rural domestic drinking water wells have detectable residues of at least one pesticide. In the same report, EPA stated that less than one percent of the wells have pesticide residues above levels considered protective of human health.

Modern technology has advanced to the point where chemicals can be detected in soil, food and water in minute quantities, as low as one part per billion, and in some cases, one part per trillion

or less. The primary concern is the chronic effect of long term consumption of drinking water with low concentrations of pesticides. The real health risks associated with many pesticides are still unknown, but data are beginning to accumulate. That is why EPA has set maximum contaminant levels (MCLs) for many pesticides already and will be doing the same for others in the future. Although large safety margins are built into determining safe chemical levels in drinking water, we all need to do our part in keeping these chemicals out of all water supplies.

Can Individual Homeowners Make a Difference?

Everyone who uses pesticides can make a difference, and homeowners and gardeners use a considerable amount of pesticides. The following approaches may be used to reduce the incidence of water pollution from pesticide chemicals around the home: (1) reduce the amount of pesticides you use, (2) handle and use all pesticides in ways to prevent water contamination, and (3) properly dispose of containers as well as unused or unwanted chemicals.

Alternatives to Pesticide Use

There are numerous methods for controlling pests, many of which do not involve the use of pesticides. Overuse of insecticide may actually create a problem by killing beneficial insects in some cases. Select lawn, garden and ornamental plants that are well adapted to your location and varieties that have disease and insect resistance or tolerance and no history of pest related problems. Your Extension agent should be able to help you in selecting adapted plants that require minimal pest management.

Practices such as mulching, hand weeding, and other cultural methods are still very effective, and may be used entirely in some cases to control pests or integrated with pesticide usage to reduce the overall amount of pesticide needed. This process is called integrated pest management or IPM. Integrated pest management strategies have been used in field crops for a number of years and are discussed in detail in many Extension publications. These same or similar strategies should work around the home to reduce pesticide use.

Recommendations for Safe and Effective Pesticide Use

Remember that no pesticide is completely safe because all are poisons and should be handled with care. The safety comparison of pesticides is expressed in relative terms, because some pesticides are more toxic than others. Look for one of the following signal words; DANGER, WARNING or CAUTION on the front of the label. It will tell you how poisonous a pesticide is if swallowed, inhaled or absorbed through skin. "DANGER" means highly poisonous; "WARNING" means moderately poisonous; and "CAUTION" means least hazardous.

There are many valid recommendations, however, on the safe use of pesticides. These recommendations are designed to protect personal safety and to reduce the incidence of environmental contamination of non-targeted areas.

1. Use a pesticide only after you have exhausted all other control methods.

2. Buy only the amount of pesticide you need. If you buy more than you can use in the immediate future, you may have to dispose of it later.
3. Store pesticides carefully. Always keep them out of the reach of children and animals.
4. Never use a pesticide for any purpose not specified. The label will tell which pests the chemical is designed to control.
5. Always use the least amount of pesticide required. Do not exceed the recommended rate. Follow label directions explicitly—if they call for one part pesticide to a certain amount of water, do not exceed the amount of pesticide. More pesticide will not give more effective control.
6. Keep Pesticides in original containers—instructions, precautions, and antidotes will always be at hand.
7. Do not use a restricted-use pesticide unless you are a certified applicator. These products are too dangerous to be used without special training.
8. Mix only the amount of chemical you intend to use each time. If you have a small amount of chemical left over, mix it with a large volume of water to make a weak solution and spray over large areas of lawn to encourage rapid break down. Do the same thing with sprayer rinse solution. Do not pour down the sink. Do not pour down any drain or storm sewer.
9. Never mix pesticides in containers used for foods.
10. Do not breathe vapors or dusts, and avoid contact with skin, eyes and mouth. Wear whatever degree of protective clothing the label recommends.
11. Keep children and pets away from areas where you mix or apply pesticides.
12. Allow adequate ventilation when applying pesticides indoors. When spraying outdoors, close the windows of your house.
13. Do not smoke or eat while mixing or applying pesticides.
14. Do not apply chemicals when it is extremely windy.
15. Guard against runoff of chemicals into streams. Do not spray within 50 feet of streams. Do not spray if you think it is going to rain within an hour. Clean up spills promptly with soil, sawdust or kitty litter and spread it over a large area to encourage rapid break down. Avoid over-application when treating lawn, shrubs or garden.
16. Guard against contamination of groundwater. Do not spray chemicals next to operating wells, abandoned wells, or sink holes. Do not spray where runoff or spills can drain into abandoned wells or sink holes. Do not rinse containers or store chemicals next to wells.
17. After finishing with a pesticide container, make sure it is completely empty. If glass, metal or plastic nonpressurized container, triple rinse with adequate water, and spray rinse water over a large area as mentioned in item 7 above. Empty, triple-rinsed containers can be placed in household trash targeted for a sanitary landfill. Disposal of unwanted pesticides, will be covered in the following section.

Disposing of Containers and Unused or Unwanted Pesticides

One major purpose of proper disposal of pesticides and pesticide containers is to keep the pesticide from getting in the general environment where it could end up in water.

Container Disposal. All containers should be completely empty before disposal. In general, both pressurized and nonpressurized containers can be disposed of in home refuse headed to a sanitary landfill. Call your sanitation department to confirm this, however, because some have a special collection center for pesticide containers. Glass, metal and plastic containers should be triple rinsed, and wrapped in several layers of newspaper prior to disposal. If glass tie securely in thick paper and break prior to disposal. Aerosol cans should be wrapped but not punctured.

Pesticide Disposal. Getting rid of unused or unwanted pesticides in ways other than labeled uses is a problem. We should not pour them down a drain. If burned they may give off hazardous vapors unless incinerated at a very high temperature. Burying a pesticide under the ground is not a proper solution either because it can still cause problems later on. Some states have periodic collection drives for unwanted pesticides. Alabama has no such program at the present time.

Private citizen or citizen groups or organizations should not attempt to collect pesticides for disposal. The potential hazards of such projects related to accidental spillage and personal health is too great for untrained persons handling and moving large volumes of pesticides. If you have an interest in initiating such a movement and getting the appropriate organizations involved in a pesticide collection program, guidelines are available. A paper entitled "Summary of Interim Guidelines for Disposal of Surplus Pesticides and Pesticide Containers" is available at a cost of \$3.00 each (National Technical Information Service, Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151).

Pesticides banned by EPA may now be classified as hazardous waste, and thus, require special guidelines for disposal. If this information is not available from your county Extension agent call the Alabama Department of Environmental Management (ADEM) at 205--271-7700 and ask for the Hazardous Waste Branch of the Land Division for specific instructions on disposal of hazardous waste.