

PESTICIDE FACTS

Fact Sheet No. 2

Protecting Groundwater From Pesticide Contamination

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Groundwater is the source of water for wells and springs. It is widely used for household and other water supplies. About half the people in the United States depend on groundwater as a source of drinking water. Ninety percent of them are rural residents.

Groundwater forms when water moves below the earth's surface and fills in empty spaces in and around rocks and soil. In the past few years contamination of groundwater with pesticides has featured prominently in the news media. As a pesticide user it is your responsibility to take any and all precautions necessary to protect groundwater from contamination by pesticides.

Pesticides are usually applied to or near the surface of the ground. Five major factors determine whether they will reach groundwater:

- the practices followed by the pesticide applicator,
- the presence (or absence) of surface water from rain or irrigation,
- the characteristics of the pesticide being used,
- the type of soil in the area of application,
- the location of the groundwater
- the distance from the surface and the type of geological formations above it.

Good application practices include careful attention to the pesticide label. Pesticide labels have been developed to provide instruction on how to use the material for the best control of pests with the least risk of environmental contamination. The proper timing and placement of pesticides are very important.

Mix and calibrate accurately. Avoid the temptation to use more product than the label directs. Overdosing will

not do a better job of controlling the pests, it will only increase both the cost of pest control and the chance that the material may reach groundwater. Calibrate equipment carefully and recheck it often. Measure chemical concentrates and diluents accurately.

Avoid spills when mixing and loading. Use a backflow preventer or back-siphoning preventer when drawing mix water directly from a well or a pond.

Dispose of wastes properly. Improper disposal of empty containers, equipment rinse water, or unused chemical can cause localized groundwater problems. Triple-rinse or pressure-rinse containers and pour the rinse water into the spray tank. Leftover product in your spray tank must be disposed of in a manner consistent with the product label. Avoid having leftover tankmix in the first place by mixing only the quantities you need. Do not drain rinse water from equipment into ditches, streams, ponds, lakes or other water sources.

Prolonged heavy rain or excessive irrigation will produce excess surface water. If there is more water on the soil than the soil can hold, the water with pesticides in it is likely to move downward to the groundwater. Use weather forecasts, personal observations and irrigation scheduling to predict when excess surface water may be a problem.

Consider using Integrated Pest Management practices to reduce the amount of pesticides necessary to achieve pest control.

Agricultural chemicals vary in the potential for moving to groundwater. Three properties of pesticides which may influence such movement are:

Solubility. Chemicals vary greatly in water solubility; the greater the water solubility, the more potential for movement of the product to groundwater.

Soil adsorption. Some chemicals become tightly bound to soil particles and do not move in the soil, some are not so strongly adsorbed, and are more likely to move.

Persistence. Some chemicals break down quickly; other, persistent materials take a long time to break down. The more persistent ones are more likely to reach groundwater over time.

Three major soil characteristics affect chemical movement:

Soil Texture. This is an indication of the proportions of sand, silt, and clay in the soil. Pest control products tend to be adsorbed mostly on clay and organic matter. Coarse, sandy soils generally allow water to move rapidly downward and offer few opportunities for adsorption. Finer textured soils generally allow water to move at much slower rates, and they contain more silt and organic matter to which pesticides and other chemicals may be adsorbed.

Soil Permeability. This is a general measure of how fast water can move downward in a particular soil. The more permeable soils must be carefully managed to prevent any form of chemical from reaching groundwater.

Soil Organic Matter. This influences how much water the soil can hold before movement occurs. Increasing organic matter will increase the water-holding capacity of the soil. Some pesticides may also be adsorbed into organic matter.

The distance of groundwater from the surface and permeability of



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geologic layers is another important factor. If the groundwater is within a few feet of the soil surface, and geologic layers are highly permeable, groundwater contamination is more likely to occur than if groundwater occurs at greater depths and below im-

pervious geologic layers.

For more information on Integrated Pest Management Practices contact your local Extension Service. For information on soil types contact your local Soil Conservation Service.

'This information adapted from Protecting our *Groundwater A Growers Guide*. 1987. American Farm Bureau Federation, National Agricultural Aviation Association. *National Agricultural Chemicals Association*, U.S. Department of Agriculture, Extension Service.

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