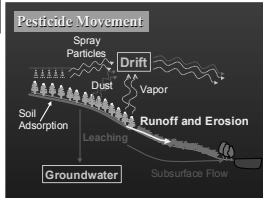


Pesticides and the Environment

Chapter VI and Chapter XX



Vermont Agency Of Agriculture, Food & Markets



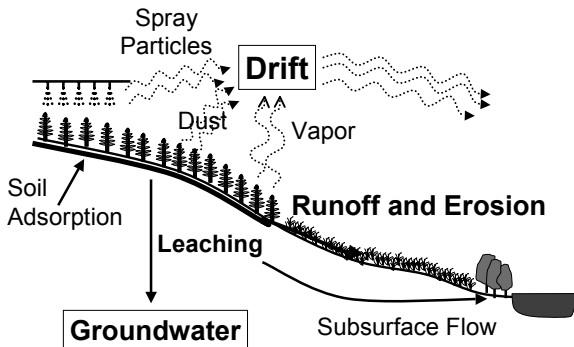
Prepared by Sid Bosworth

When pesticides move off target, they become potential pollutants affecting air, water resources, wildlife, beneficial insects, and other crops.

As pesticide applicators, it is important to do your job carefully by both controlling pest populations and at the same time protecting the environment.



Pesticide Movement



Drift must be avoided.

Can Injure:

- People
- Pets
- Wildlife
- Bees
- Sensitive plants



Vapor Drift

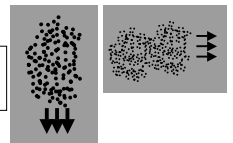
- The evaporation of a pesticide (conversion from liquid or solid into a gas)
- Related to the chemical properties of the pesticide
- Vapor pressure data is not on the label, but look for warning statements
- Avoid applications when conditions favor volatilization



High Temperatures and Low Humidity

Particle Drift

The smaller the particle, the greater the potential for drift.

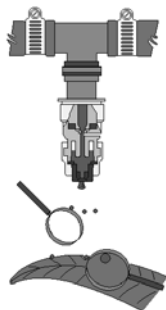


Whenever practical, the applicator should use the largest droplet or particle size in obtaining effective pest control.

Particle Drift

Influenced by many factors

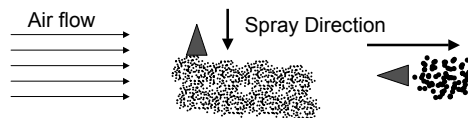
- Nozzle design
- Spray Pressure
- Air Temperature
- Humidity
- Spray orientation and height of release
- Air speed and direction



Nozzle Orientation and Height

Nozzles positioned too high will disperse spray over a wider area increasing the risk of drift.

Nozzles pointed across the air flow produce smaller droplets because of wind shear.



Environmental Conditions and Drift

Avoid high and fluctuating wind speeds. A hand held anemometer can help make decisions. Avoid turbulent conditions.

At high temperatures and low humidity, fine droplets can evaporate before they even reach their desired target.

Avoid application during inversions.

Apply in early morning or evening.

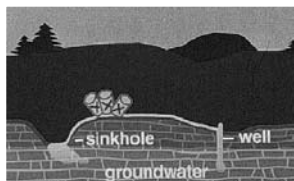
Pesticides and Water Resources

- Groundwater
 - A drinking water issue.
 - Half of the U.S. population and 90% of the rural population rely on groundwater for drinking water.
- Surface waters
 - A drinking water issue
 - A wildlife issue



Types of Pollution

- Non-Point Source Pollution
 - Occurs after normal and correct use usually due to leaching or runoff
- Point Source Pollution (direct discharge)
 - Spills
 - Back siphoning
 - Handling or applying near sensitive areas like wells, sinkholes or streams



Pesticides and Groundwater

- Pesticides can get into groundwater either by way of leaching through the soil or through direct means (point source pollution)
- It takes a very long time for pesticides to break down in groundwater.
- The best solution for groundwater pollution is **prevention**.

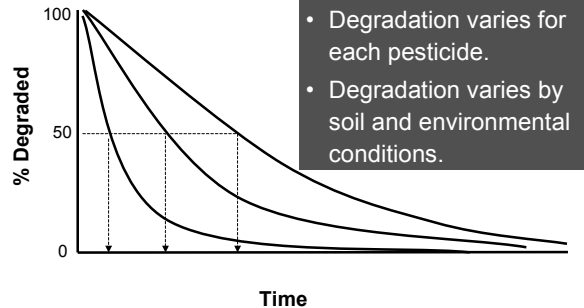


Pesticides and Leaching

The amount of leaching depends on:

- Pesticide properties
 - Solubility
 - Degradation (half life)
- Microbial degradation
- Chemical degradation
- Photodegradation

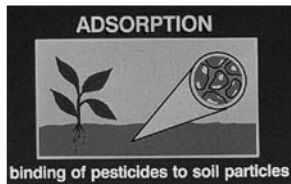
Degradation is measured in Half-Life



Pesticides and Leaching

The amount of leaching depends on:

- Pesticide properties
 - Solubility
 - Degradation (half-life)
 - Adsorption potential
- Soil texture and structure
- Soil organic matter
- Depth of water table
- Rainfall or irrigation amounts
- Conservation practices

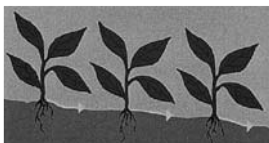


Reducing the Risks of Leaching

- Read label for any warnings
- Know your soils and pesticides for vulnerability
- Consider the location of application - know location of wells, sinkholes, ditches
- Avoid handling and mixing near wells
- Apply pesticides at appropriate time and rate
- Use buffer strips and riparian areas
- Dispose of pesticides properly. Triple-rinse containers. Pour rinse water back into tank.
- Store pesticides safely
- Maintain records

Pesticides and Surface Water

- Pesticides get into surface waters primarily by way of surface runoff when water carries pesticides, either mixed in the water or bound to eroding soil, to off target points.
- Polluted groundwater can also seep into surface waters.
- The best solution for surface water pollution is **prevention**.



Pesticides and Runoff

The amount of runoff depends on:

- Slope of area
- Erodibility and texture of soil
- Soil moisture content
- Intensity and timing of rainfall
- Pesticide properties



Reducing the Risks of Runoff

Practices that reduce runoff:

- Conservation practices that prevent erosion
- Timely applications
- Buffer strips and riparian areas



Pesticides and Wildlife

- The areas receiving pesticides - farms, parks, lawns, golf courses - are also the areas that provide habitat for wildlife.
- As stewards of the landscape, we must use caution to protect these areas.
- Pesticide applicators must be particularly aware of endangered species. Direct impact or impact to their habitat must be avoided.

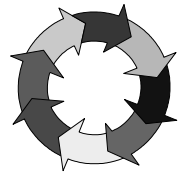
Pesticides and Honeybees

- Check labels for specific bee hazards and select pesticides that are least harmful to foraging bees
- Avoid formulations most harmful to bees
 - Dusts are worse than sprays
 - Wettable powders are usually worse than EC's or water soluble formulations
 - Avoid microencapsulated insecticides
- Avoid applications to crops in bloom
- Spray in late afternoon or evening



Pesticides and The Food Chain

- Fish and wildlife can be exposed to pesticides by eating animals poisoned by pesticides or plants containing pesticides.
- Pesticides that can build up in animal tissue can cause accumulation. (ie., DDT)
- Non-accumulative pesticides do not build up in animal tissue.
- There is no relationship between the potential to accumulate and pesticide toxicity or persistence.



Pesticide Persistence

- Persistent pesticides resist degradation.
- Persistent pesticides are not necessarily bioaccumulators.
- There is no relationship between persistence and level of toxicity.
- Persistence is a desirable trait for some purposes but should be avoided when not necessary or poses environmental risk.



Summary

- Pesticides can have a positive and negative impact on water resources and wildlife.
- Be aware of the possible means of pesticide transport from the target site to an off target site.
- Use common sense concerning handling, mixing, applying and disposing of pesticides and pesticide containers.
- Follow label directions to minimize risks associated with negative pesticide effects on the environment - It's the Law!

