



# Pesticides and the Environment

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**Why do we even care about a  
pesticide being in our environment?**



Pesticides can move!



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- **Sources of groundwater**
  - rain, snow, etc.
  - some from lakes, rivers, irrigation, etc.



Pesticides entering water sources are a special concern.



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ **Movement of water** (3 ways)
  - ▶ evaporation into the air
  - ▶ movement across a surface (like a stream)
  - ▶ movement downward into the soil



# *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ Pesticide factors affecting movement
  - ▶ solubility
  - ▶ adsorption
  - ▶ persistence



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ **Pesticide factors affecting movement**

- ▶ **solubility** - the ability of a pesticide to dissolve in water



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ **Pesticide factors affecting movement**

- ▶ **adsorption** - some pesticides become tightly attached to soil particles and do not readily move



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ **Pesticide factors affecting movement**
  - ▶ **persistence**- some pesticides breakdown more slowly and stay in the environment longer (half life)



## *Special Environmental Concerns: Protecting Ground Water & Endangered Species*

- ▶ **Pesticide factors affecting movement**
  - ▶ **solubility** - the ability of a pesticide to dissolve in water
  - ▶ **adsorption** - some pesticides become tightly attached to soil particles and do not readily move
  - ▶ **persistence**- some pesticides breakdown more slowly and stay in the environment longer



## ***Special Environmental Concerns: Protecting Ground Water & Endangered Species***

- Take steps to prevent ground water contamination
  - apply pesticides at labeled rates
  - know where the water table is
    - if high, don't use soil injection pesticides



Protecting ground water &  
endangered species is very important!

What about other animals & sites?

## Other “sensitive” sites!




**Sensitive can be related to sites or living things that are easily injured.**

Can you name some other sensitive areas or things?



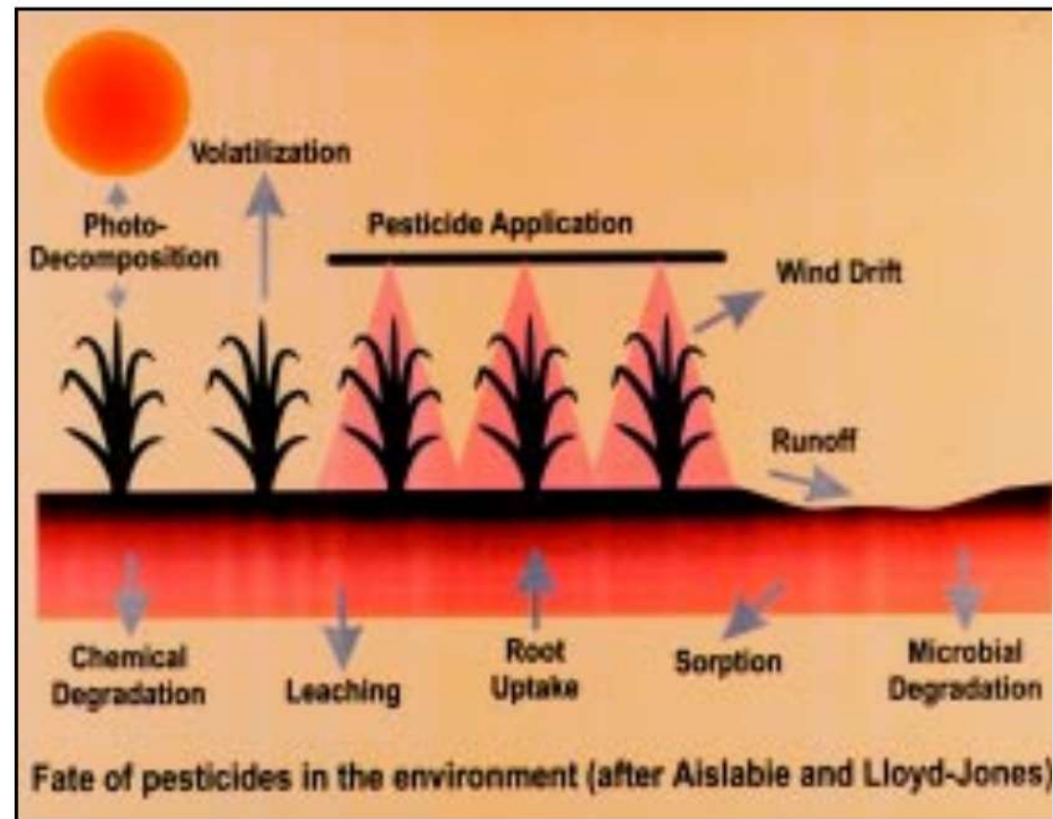
Now let's look at other ways for a pesticide movement in our environment.

## ***Pesticides and the Environment***




Do you have any ideas  
about how exactly  
pesticides do move in our  
environment?

# What happens to pesticides when we spray?



Source: NRCS Soil Quality Concerns, Jan. 1998



A lot happens when we spray a pesticide. Let's take a closer look at some more specifics.



## ***Pesticides and the Environment***

- **Soil**
- **Water**
- **Air**



## ► **Soil factors affecting pesticide movement**

- soil texture - relative proportions of sand, silt, and clay
- soil permeability - general measure of how fast water can move downward
- soil organic matter - influences the amount of water a soil can hold (the more organic the more water)

# Pesticide Movement - Soil

In Which Soil Would Pesticides Leach The Fastest?

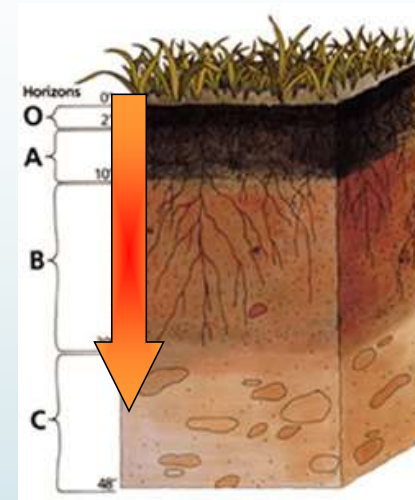
Texture	Organic Matter Content	Permeability
<b>Coarsest:</b> gravel	Lowest	<b>Fastest</b>
Coarse Sand		↓
Medium Sand		
Fine Sand		
Very Fine Sand		
Silt		
<b>Finest:</b> Clay	Highest	<b>Slowest</b>

Applying Pesticides Correctly, Table 5.2



# Pesticide Movement - Water

► **Runoff:** pesticide movement in water across the treated surface



► **Leaching:** pesticide movement downward from the surface



## *Pesticides and the Environment*

- ▶ Air – typically by **drift**
  - ▶ particles & droplets:  
size can determine amount of drift
  - ▶ vapors:  
normally associated with fumigants

## Pesticide Movement - Air

<b>Droplet Diameter in Microns</b>	<b>Droplet Called</b>	<b>Time Required to Fall 10 ft in Still Air</b>	<b>Distance Covered Falling 10 ft in 3mph Breeze</b>
5	Fog	66 min	3 miles
100	Mist	10 seconds	409 feet
500	Light rain	1.5 second	7 feet
1000	Moderate Rain	1 second	4.7 feet





# *Pesticides and the Environment*

## ► Pesticide residue

- pesticides generally break down in the environment, but it may take hours or years (half life)
- pesticides can persist &/or accumulate in the environment
- The most important factor affecting pesticide breakdown rate is the **chemical structure** of its active ingredient.
- Other factors can and do influence the breakdown of a pesticide (like water present at application time, temperature, etc.).



# Sources of Contamination

How do we know where a pesticide came from and how is that defined?



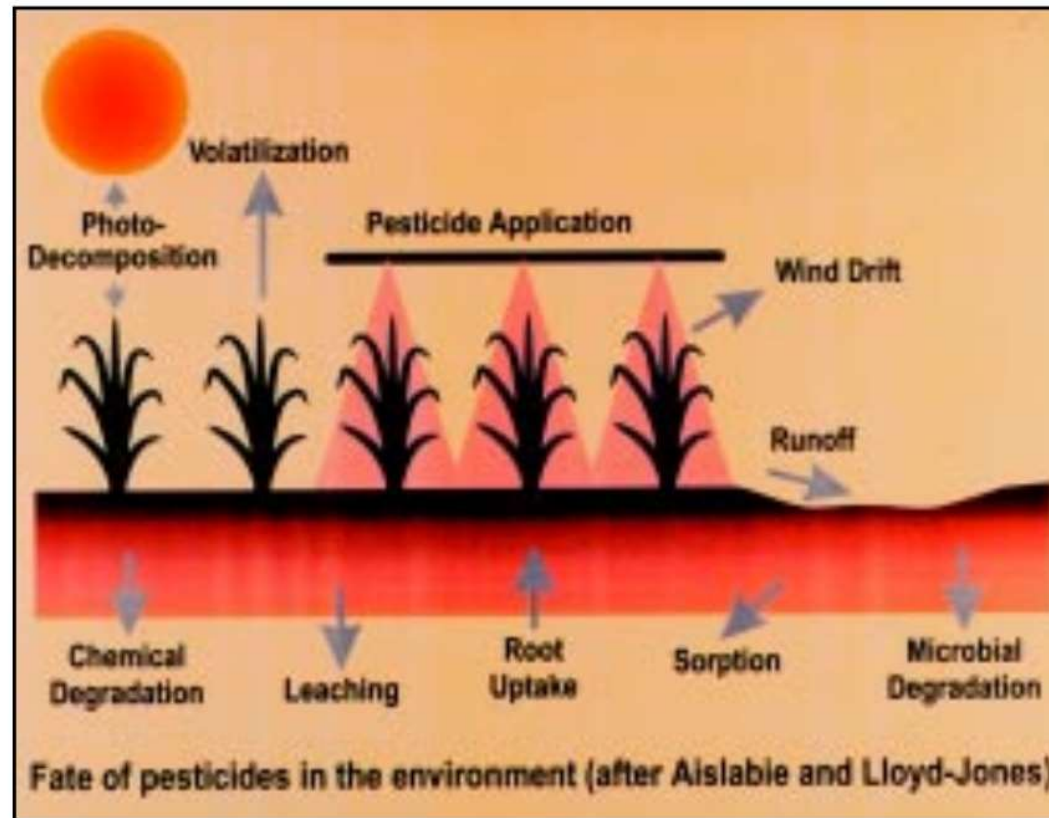
## *Pesticides and the Environment*

- Sources of contamination
  - **point source pollution** - pollution from a specific identifiable place (a pesticide spill)
  - **non-point source pollution** - pollution from a wide area (pesticide runoff into a stream)

# Point Source and Non-Point Source Pollution



So now you know the “fate” of pesticides in our environment.



Source: NRCS Soil Quality Concerns, Jan. 1998



Thank you

Any Questions?

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