Pesticide Safety

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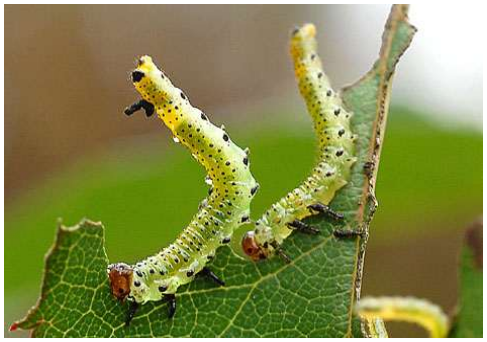
Asst. Extension Educator for Pesticide Safety Education

What is a pest?

- A pest is..






What is a pesticide?

- Definition: Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest
- Insecticides
- Fungicides
- Herbicides

Pesticide label

PSEP, Univ. of Nebraska-Lincoln

Pesticide label and labeling

- The label and labeling is binding legal agreement between
  - The product registrant (Usually the manufacturer)
  - The US EPA (Reviews the data, the label and registers pesticide)
  - The end user (You!)
- You must comply by federal law with all label instructions and use directions

Pesticide use classifications

- Restricted-Use pesticides
  - Pesticide need additional regulatory restrictions
  - Only certified applicators or **trained people** working under **direct supervision**
  - Label says “restricted-use pesticide” on the front panel of the label
- Unclassified or general use pesticides

When do you read the label?

Read the label before you:

- Buy the pesticide
- Mix, load and apply the pesticide
- Store the pesticide
- Dispose of unused pesticide and empty containers

Parts of a pesticide label

Ingredient statement

Net contents

NOMO'TODES is a fictitious label used for instructional only

NOMO'TODES 3E

Nematicide

For effective control of nematodes on turfgrasses.

RESTRICTED USE PESTICIDE

Due to High Acute Toxicity and Toxicity to Wildlife

For Sale to and Use Only by a Certified Applicator for Uses Authorized by His Certification, or By Persons Under His Direct Supervision.

ACTIVE INGREDIENT:

Krypton: Ethyl 3-phenyl (methyl) phosphoramidate…….. 35%

INERT INGREDIENTS: …….. 65%

TOTAL 100%

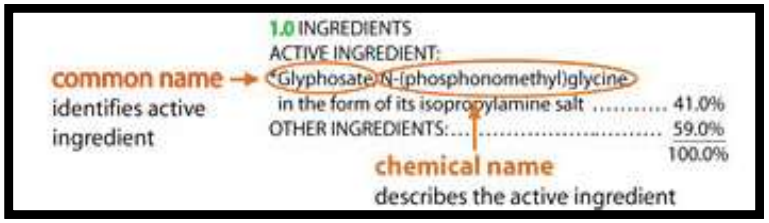
Contains Aromatic Petroleum Distillates

Contains 3 pounds of KRYPTON per gallon.

EPA Reg. No. 1234-567 EPA Est.No. 122-NC-2

Pesticide names

- **Trade** name
  - Roundup
- **Common chemical** name
  - Glyphosate
- **Technical chemical** name
  - Isopropylamine glyphosate (N-(phosphonomethyl)glycine)

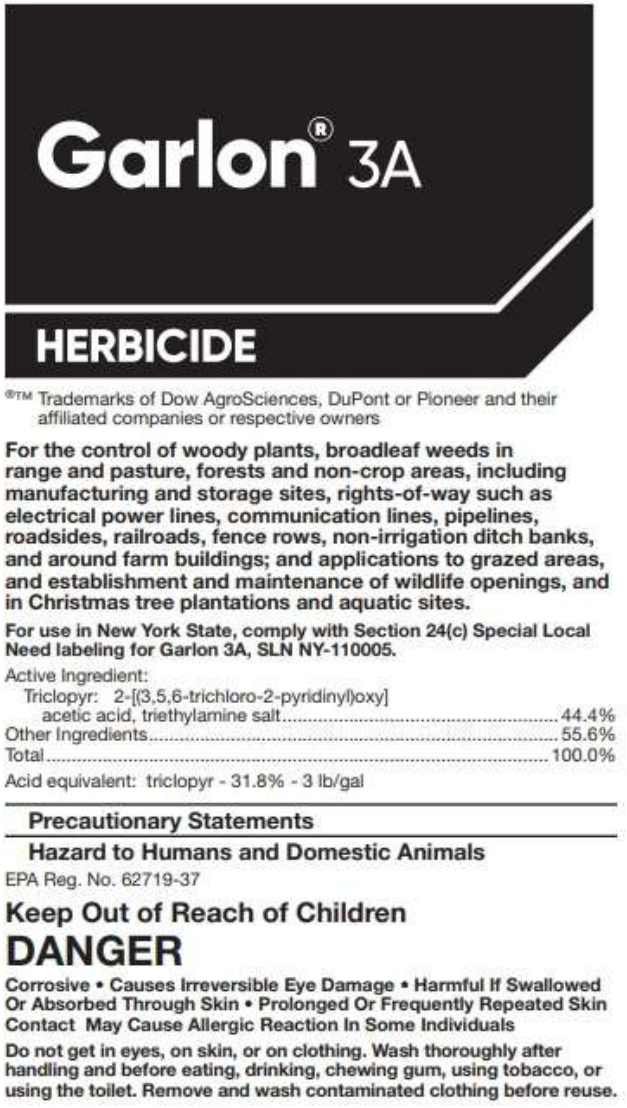


Signal words and symbols

- Signal words indicate the relate acute (onset <24 hours) toxicity to humans and animals

Danger-Poison | **Warning**

Danger | **Caution**



Garlon® 3A

HERBICIDE

®™ Trademarks of Dow AgroSciences, DuPont or Pioneer and their affiliated companies or respective owners

For the control of woody plants, broadleaf weeds in range and pasture, forests and non-crop areas, including manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, and around farm buildings; and applications to grazed areas, and establishment and maintenance of wildlife openings, and in Christmas tree plantations and aquatic sites.

For use in New York State, comply with Section 24(c) Special Local Need labeling for Garlon 3A, SLN NY-110005.

Active Ingredient:

Triclopyr: 2-[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid, triethylamine salt	44.4%
Other Ingredients	55.6%
Total	100.0%

Acid equivalent: triclopyr - 31.8% - 3 lb/gal

Precautionary Statements

Hazard to Humans and Domestic Animals

EPA Reg. No. 62719-37

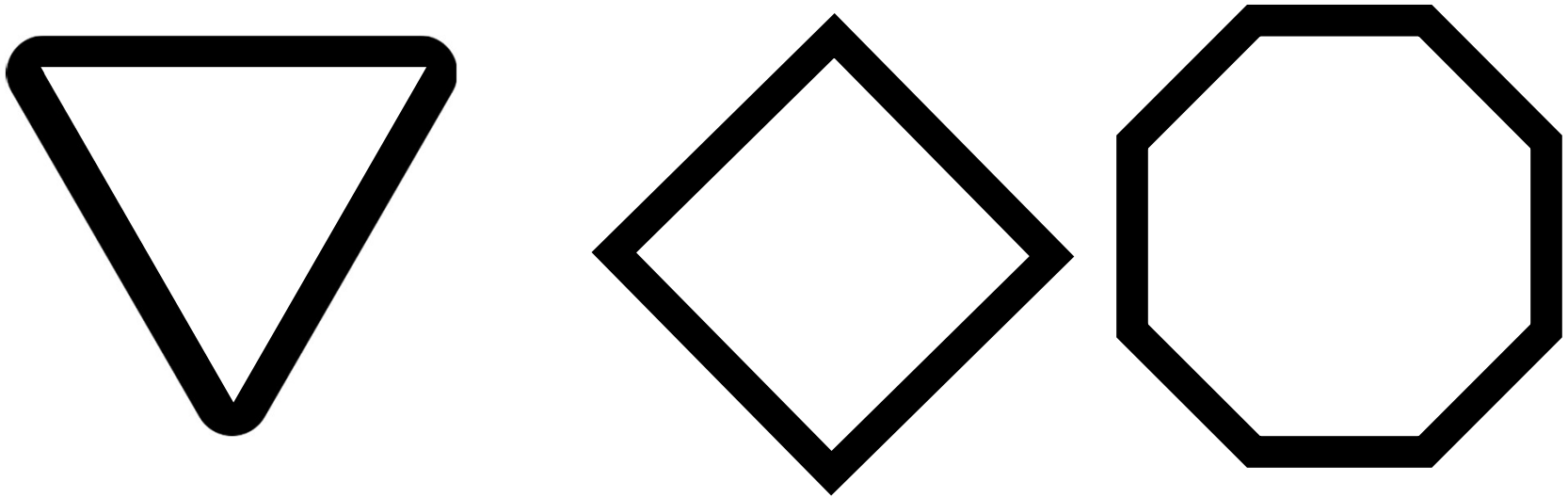
Keep Out of Reach of Children

DANGER

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed Or Absorbed Through Skin • Prolonged Or Frequently Repeated Skin Contact May Cause Allergic Reaction In Some Individuals

Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

Signal words and symbols



CAUTION (III)	WARNING (II)	DANGER (I)
Relatively Non-toxic to Slightly Toxic	Moderately Toxic	Highly Toxic

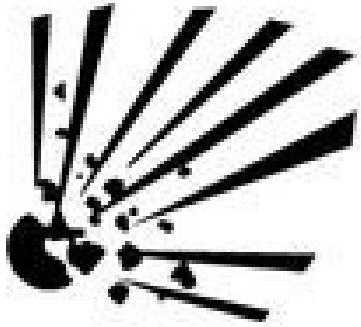
Signal words and symbols

- Labels can have 4 risk symbols

Poison

Flammable

Corrosive



Explosive

Precautionary statements

- Hazards to humans and domestic animals
  - “Danger-poison”, “Danger”, “Warning”, and “Caution”
- Routes of entry statements
  - “May be fatal If swallowed or inhaled”
- Specific action statements
  - “Avoid contact with skin or clothing”
- Protective clothing and equipment (PPE) statements

Personal protective equipment (PPE)

- Follow the directions for PPE stated on the label
- Lack of statement does not mean you do not need further protection

PROTECTIVE CLOTHING REQUIREMENTS

When making applications, applicators must wear:
a long-sleeved shirt, long pants, mid-forearm length protective gloves and protective boots. In addition, a protective apron and goggles or face shield must be worn during mixing/loading.

Statement of practical treatment

- First-aid

- Lists recommended treatments for accidental exposure or poisoning

some individuals.

FIRST AID	
IF ON SKIN	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
IF INHALED	• Move the person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
IF SWALLOWED	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
For MEDICAL emergencies, Call 24 Hours a Day **1-800-225-2883**	
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-225-2883	

Statement of practical treatment

- Information for the physician

- Note to physician describes medical treatment for poisoning emergencies

Environmental hazard statements

ENVIRONMENTAL HAZARDS

To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems. This pesticide is toxic to wildlife. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treated area.

PHYSICAL OR CHEMICAL HAZARDS: Do not apply this product in or on electrical equipment due to the possibility of shock hazard.

NOTICE: To the extent allowed by law, buyer assumes all risks of use, storage or handling of this product not in accordance with directions.

†THE ORTHO® GUARANTEE: If for any reason you, the consumer, are not satisfied with this product, mail us proof of purchase to obtain a full refund of your purchase price.

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PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon  in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.

Bees and other insect pollinators will forage on plants when they flower, shed pollen, or

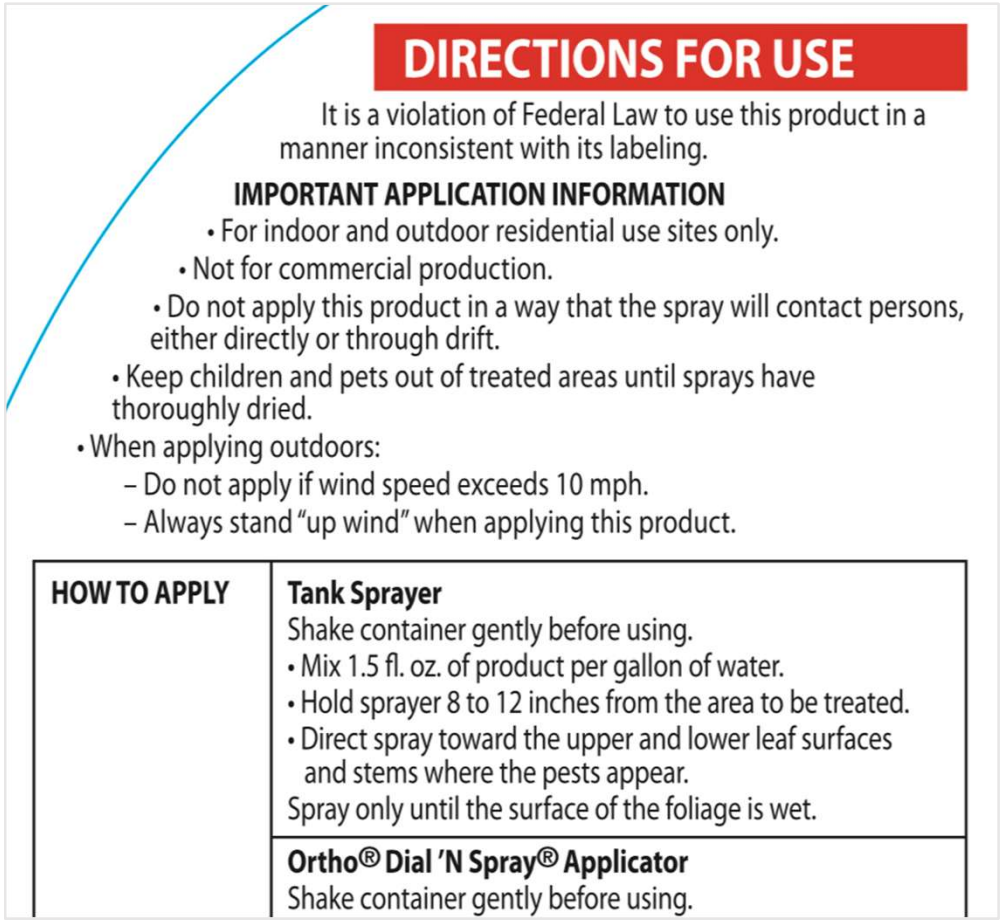
Physical or chemical hazards

- Describes any special, fire, explosive or chemical hazards
- Flammable: Do not use or store near heat or open fire
- Corrosive: Store only in a corrosion resistant tank

Hazard statements on different labels are not necessarily located in same place

Directions for use

- The statement "**It is a violation of Federal law to use this product in any manner inconsistent with its labeling**"



DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

IMPORTANT APPLICATION INFORMATION

- For indoor and outdoor residential use sites only.
- Not for commercial production.
- Do not apply this product in a way that the spray will contact persons, either directly or through drift.
- Keep children and pets out of treated areas until sprays have thoroughly dried.
- When applying outdoors:
  - Do not apply if wind speed exceeds 10 mph.
  - Always stand "up wind" when applying this product.

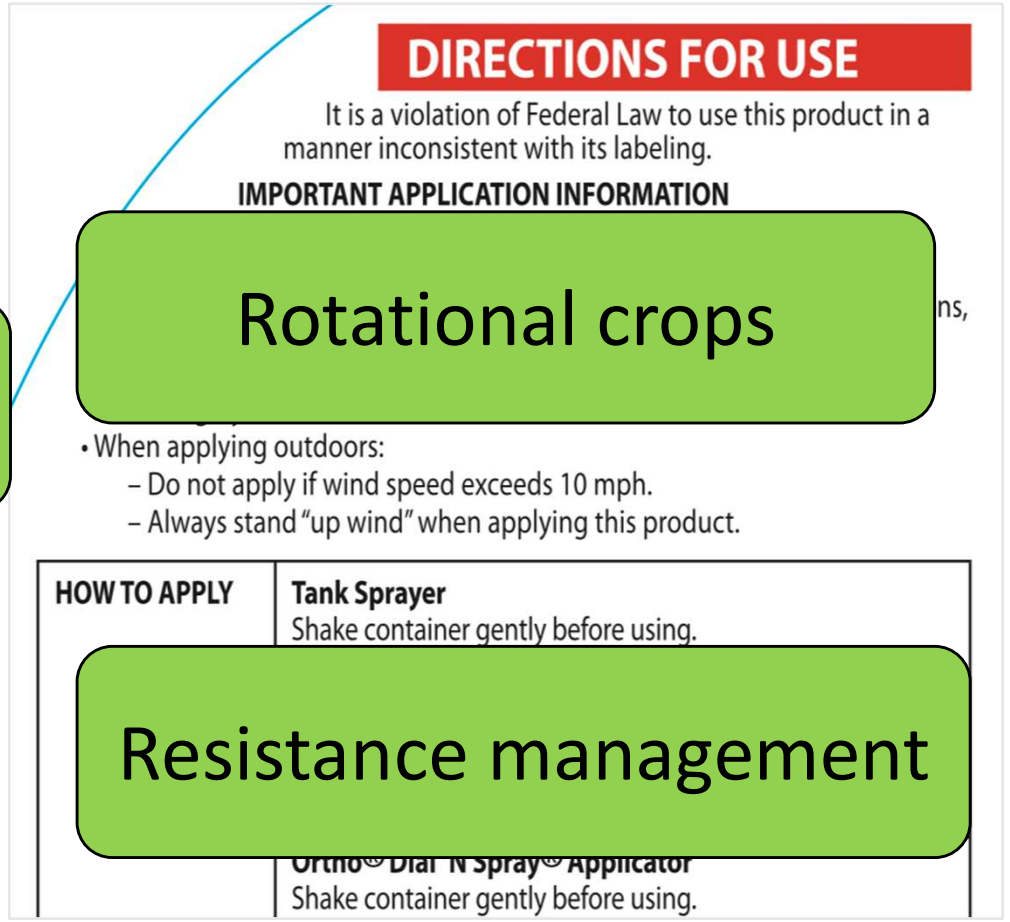
HOW TO APPLY	**Tank Sprayer** Shake container gently before using. • Mix 1.5 fl. oz. of product per gallon of water. • Hold sprayer 8 to 12 inches from the area to be treated. • Direct spray toward the upper and lower leaf surfaces and stems where the pests appear. Spray only until the surface of the foliage is wet.
	Ortho® Dial 'N Spray® Applicator Shake container gently before using.

Directions for use

- The statement "**It is a violation of Federal law to use this product in**

Buffer zones

Drift management



Directions for use

- Modes of action and resistance management
- Listing of crops, pests, and specific directions
- Spray drift information
- Tank mixtures, restricted-entry interval, and buffer zones
- Application instructions
- Agriculture and/or non-agricultural use requirements

Uses inconsistent with the labeling

- Applying to or on plants, animals, or sites not stated on the label
- Applying at a higher rate
- Not wearing the specified PPE
- Mishandling

Know your pesticide

Follow the label

What is the Endangered Species Act (ESA)

- The ESA was first passed in 1973.
- As listed in the statute the agencies that enforce the ESA are the U.S. Fish and Wildlife Services and/or the U.S. National Marine Fisheries
- EPA assesses the risk and consults with "the Services" as needed.
- If there is potential harm, the agency will modify the labels as needed to mitigate risk.

Why Now? “Megasuit” settlement was finalized on **Sept 12, 2023**

"...the EPA **may not avoid compliance** with the ESA..."

Migrant Clinicians Network vs EPA. Dec 2023, 9th Circuit

"Before registering a pesticide, EPA must consult with the statutorily specified agencies that have expertise on risks to species' survival. **But for decades EPA routinely skipped that step when it registered pesticides**...."

Center for Biological Diversity v. EPA, Dec. 2022, DC Circuit

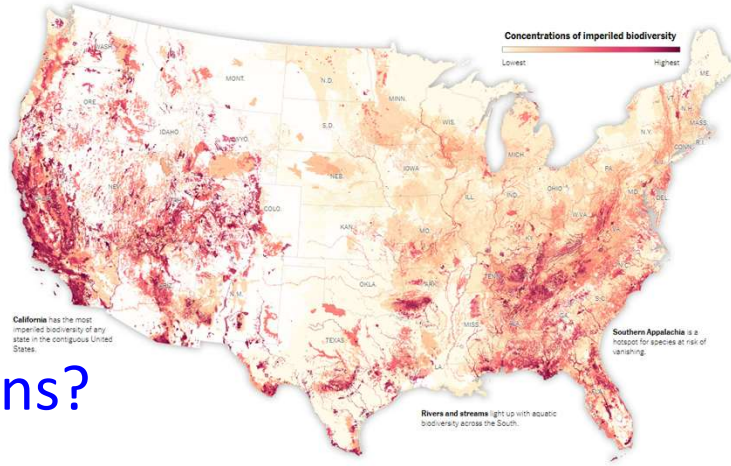
Pesticide Labels Will Be Changing To Protect Threatened and Endangered (Listed) Species and Their Habitat Only a few labels will be changing from 2024!

ESA Protection: People Say this is Too Complicated. But the EPA or Courts Have Three Main Registration Choices

Option 1: Remove pesticide from the U.S. marketplace

Option 2: Restrict its use to only crops/sites in counties or states without listed species or critical habitat

Option 3: Add mitigations to protect species



Outlook: Would you prefer to not have access

to the product or have access to it with mitigations?

Label Changes to Protect Listed Species and Their Critical Habitat

Herbicide Strategy: First example Liberty® Ultra

There are three types of label changes possible, aimed at mitigating the following:

- Spray drift
- Runoff/Erosion
- Impacts to specific geographic locations where listed species or their critical habitat are found, Pesticide Usage Limitation Areas (PULAs)

Herbicide Strategy: Finding Required Mitigations

For conventional agricultural uses, mitigations have to be determined for each field, not an entire farm

Required spray buffer and runoff/erosion mitigation can be different for each herbicide and crop combination.

Mitigations may appear on up to 3 places:

- On the product label
- Label may direct user to Bulletins Live! Two (BLT) webpage https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins
- Label may direct user to Mitigation Menu webpage https://www.epa.gov/pesticides/mitigation-menu

Additional Information

- Pesticides and Endangered Species Education Resources Toolbox https://www.epa.gov/endangered-species/pesticides-and-endangered-species-educational-resources-toolbox

EPA Reg. No. 10163-21
EPA Est. No.

Gowan®
The Go To Company

Produced For:
Gowan Company
P. O. Box 5569
Yuma, AZ 85366-5569
800-883-1844

2. Go to the Bulletins Live! Two website (it is compatible with most internet browsers):

https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins

3. Enter the EPA Registration Number into the search bar and select your product.

Example ESA Bulletins Live! Two: Pesticide Use Limitation Area (PULA) Dicamba – Aug 2024 application, Lexington KY

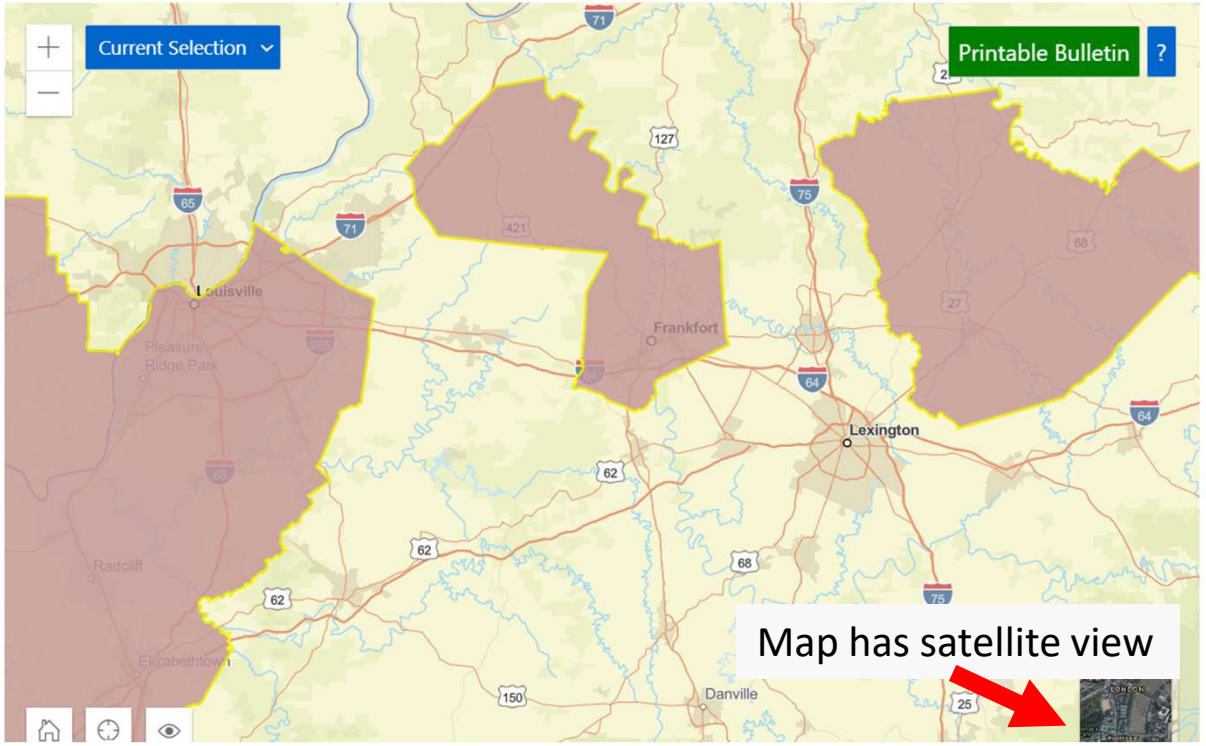
Areas in pink are to protect listed species, 310 foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer. Website has a lot more details.

You can use state, city or longitude then latitude of field application site and see if it is part of a PULA

Limitations for Selected Area

Pula ID: 52
Event Name: Dicamba - 2020
Application Month: August 2024

Product	Count
A21472 PLUS VAPORGRIP TECHNOLOGY (100-1623) *Alternate Names:* TAVIUM PLUS VAPORGRIP TECHNOLOGY	1
ENGENIA HERBICIDE (7969-472)	1
FEXAPAN PLUS VAPORGRIP TECHNOLOGY (352-938)	1
TAVIUM PLUS VAPORGRIP TECHNOLOGY (100-1623) *Alternate Names:* TAVIUM PLUS VAPORGRIP TECHNOLOGY	1



Make sure to in zoom enough so you can see the application area – especially if it is on the edge of a PULA.

Endangered Species Protectio

Application Month: July 2023
Product: All products with limitatio

1 Areas where pesticide use must be limited are identified on t
located beside the map to help pinpoint these locations.

2 Look below at the Pesticide Use Limitation Summary Table.
selected Active Ingredient(s) (ALs) or Product(s) with pesticide
printed map. Locate the Active Ingredient (AI) or Product you int
table and identify the code in the last column. This code indicate
limitation associated with that AI or Product. A limitation descript
be found below in the Codes and Limitations Table. If multiple P
Limitation Areas (PULAs) are visible on the map, these tables p
the highlighted PULA.

If you are applying a pesticide that contains more than one A
multiple Products, then multiple codes may apply. Follow the lim
when using this pesticide.

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ESPP Contact: ESPP@epa.gov Phone: 1-844-44

Endangered Species Protectio

Pesticide Use Limitation Summary Tab

Product	AI	Use	Method
A21472 PLUS VAPORGRIP TECHNOLOGY (100-1623) Alternate: TAVIUM PLUS VAPORGRIP TECHNOLOGY	Dicamba, diglycolamine salt	Dicamba-Tolerant Cotton	Ground spray
A21472 PLUS VAPORGRIP TECHNOLOGY (100-1623) Alternate: TAVIUM PLUS VAPORGRIP TECHNOLOGY	Dicamba, diglycolamine salt	Dicamba-Tolerant Soybean	Ground spray
ENGENIA HERBICIDE (7969-472)	Dicamba	Dicamba-Tolerant Cotton	Ground spray
ENGENIA HERBICIDE (7969-472)	Dicamba	Dicamba-Tolerant Soybean	Ground spray
FEXAPAN PLUS VAPORGRIP TECHNOLOGY (352-938)	Dicamba, diglycolamine salt	Dicamba-Tolerant Cotton	Ground spray
FEXAPAN PLUS VAPORGRIP TECHNOLOGY (352-938)	Dicamba, diglycolamine salt	Dicamba-Tolerant Soybean	Ground spray
TAVIUM PLUS VAPORGRIP TECHNOLOGY (100-1623) Alternate: TAVIUM PLUS VAPORGRIP TECHNOLOGY	Dicamba, diglycolamine salt	Dicamba-Tolerant Cotton	Ground spray

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Endangered Species Protection Bulletin

TAVIUM PLUS VAPORGRIP TECHNOLOGY (100-1623) Alternate: TAVIUM PLUS VAPORGRIP TECHNOLOGY	Dicamba, diglycolamine salt	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
XTENDIMAX WITH VAPORGRIP TECHNOLOGY (264-1210) Alternate: M1768 Herbicide	Dicamba, diglycolamine salt	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
XTENDIMAX WITH VAPORGRIP TECHNOLOGY (264-1210) Alternate: M1768 Herbicide	Dicamba, diglycolamine salt	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120

Codes and Limitations Table

Code	Limitation
D120	To protect federally listed threatened and endangered species, both a 310-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required. If applying to dicamba-tolerant soybeans with a qualified hooded sprayer, both a 240-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required to protect federally listed threatened and endangered species. Please see the label for a link to the website(s) with your product's qualified hooded sprayers. The following areas may be included in the buffer distance composition when directly adjacent to the treated field edges: 1. Roads, paved or gravel surfaces, mowed grassy areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated field. 2. Planted agricultural fields containing dicamba-resistant plantings of cotton and soybeans. 3. Areas covered by the footprint of a building, silo, or other man made structure with walls and or roof.

This document contains legal requirements for the use of certain pesticides.
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ESPP Contact: ESPP@epa.gov Phone: 1-844-447-3813

Label and Labelling Awareness

- What does this mean as an applicator?
  - Advanced planning
  - Visit noted websites from label
  - Evaluate fields/farming practices
  - Bulletins for application
  - Follow all requirements from websites

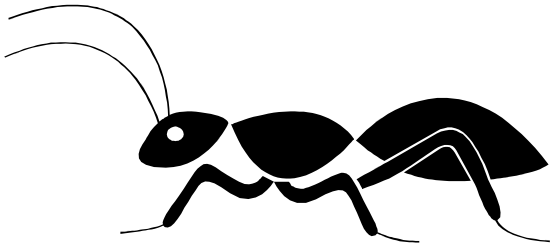
An aerial view of riparian buffers along a creek containing a mix of trees and herbaceous vegetation. Photo by U.S. Department of Agriculture.

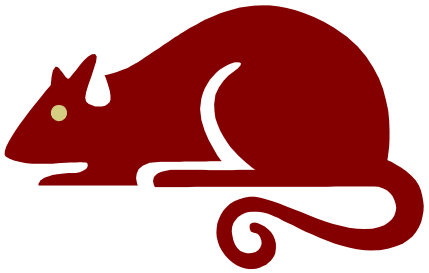
2. Pesticide hazards and first aid

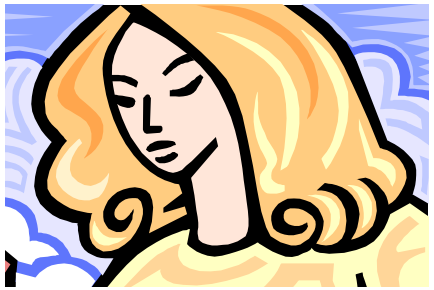
Pesticide action network (PAN)

Pesticides and humans

- Similar nervous , circulatory, and respiratory systems

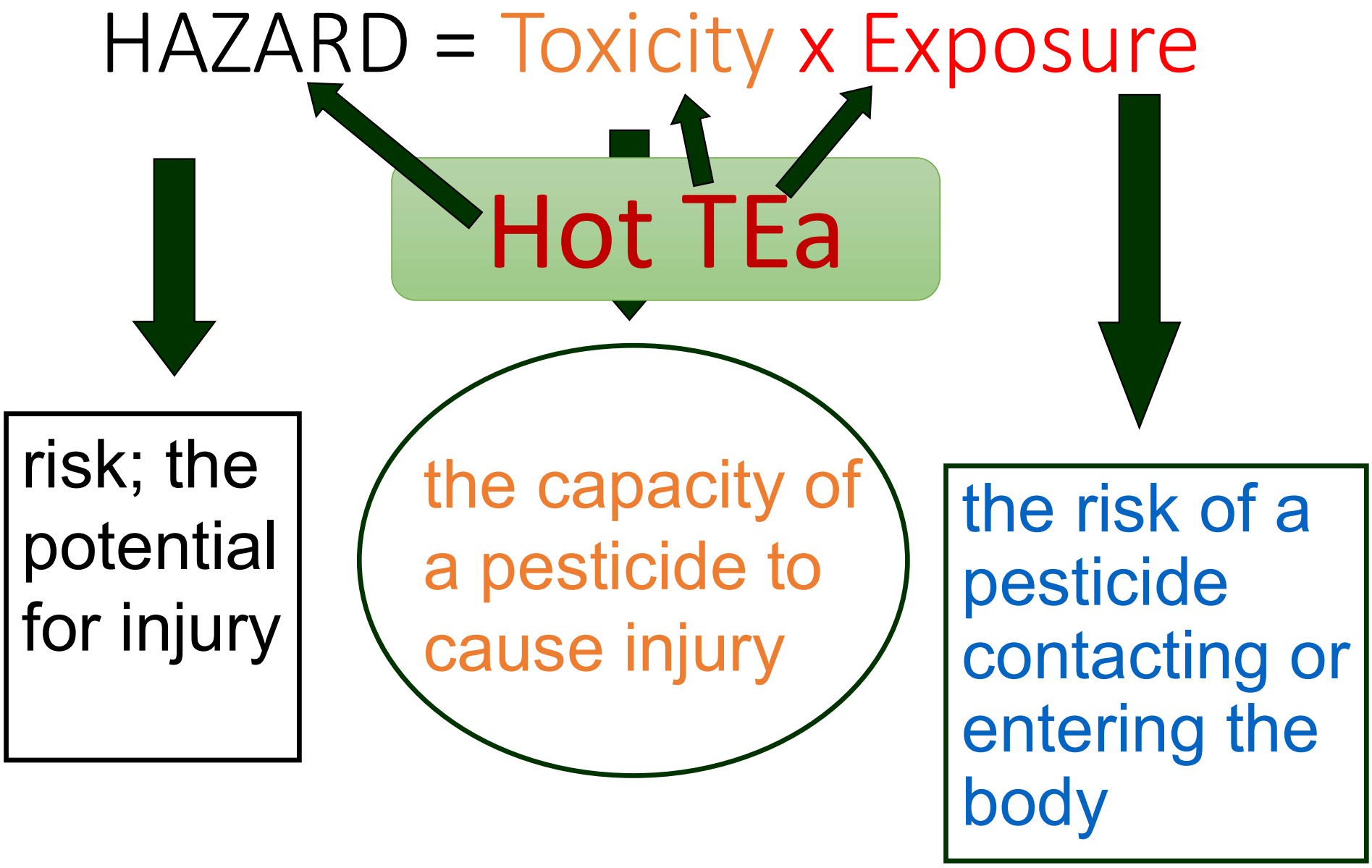






- Health effec

What is Hazard?


HAZARD = Toxicity x Exposure
Hot TEa
risk; the potential for injury
the capacity of a pesticide to cause injury
the risk of a pesticide contacting or entering the body

Hazard

- Higher toxicity = greater hazard
- Lower toxicity = less hazard
- Higher exposure = greater hazard
- Lower exposure = less hazard

Hazard increase..

- When mixing and loading the concentrate
- With a very high single exposure
- After many exposures over time

Poisoning effects

- Contact
- Systemic
- Allergic

Contact effects

- Injury at the point of contact
- Skin, eyes, respiratory tract are most often affected

Contact injury to the skin is the most common form of pesticide poisoning!

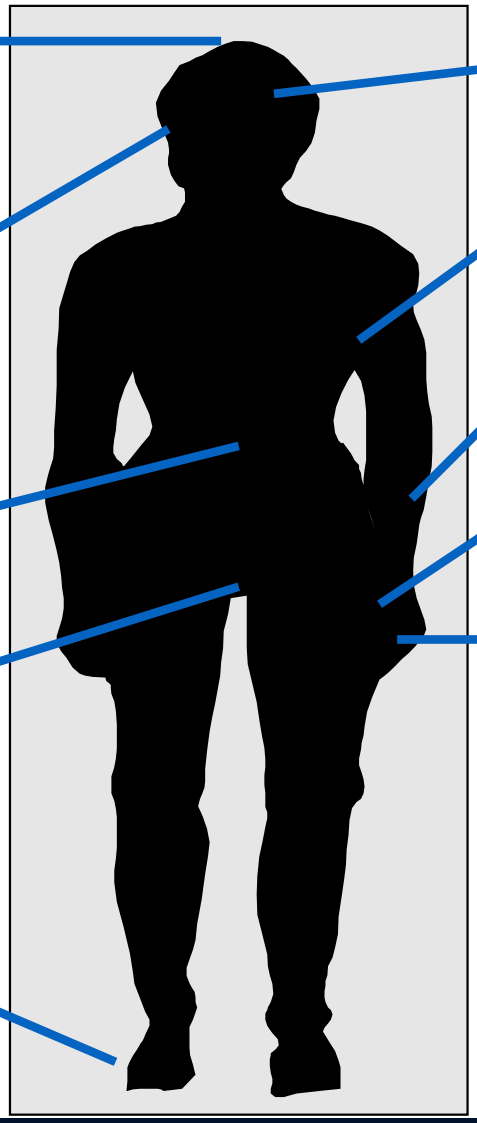
Systemic effects

- Poisoning effects that occur at sites than their entry point
- Effects on us similar to those in the target animals
  - Insecticides: nervous system (inhibition or damage)
  - Rodenticides: circulatory system (impairs blood clotting)

Allergic effects

- Refers to hypersensitivity to a specific substance
- Dermatitis, blisters, hives
- Life-threatening shock
- Red or itchy eyes
- Respiratory discomfort, asthma

Routes of pesticide entry



Scalp 32%

Ear Canal 40%

Abdomen 18%

Genital Area 100%

Ball of Foot 13%

Forehead 36%

Armpit 64%

Forearm 9%

Palm 12%

Back of Hand 21%

Percent Dose Absorbed
Chemical -parathion
Maibach 1974

Skin (dermal)

97% of all body exposure during spraying is by skin contact!

Skin (dermal)

- Warm, moist area
- Cuts, abrasions, and rashes
- Pesticide formulations affect absorption

Least absorbed → **Most absorbed**

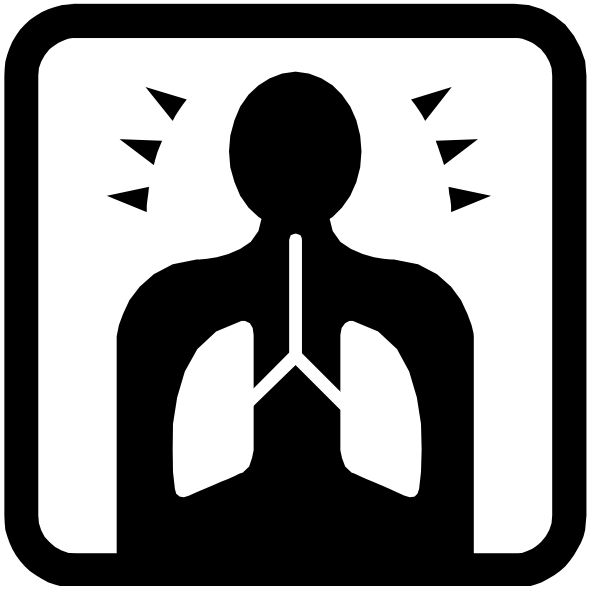
Oral (Mouth)

Always wash your hands!

...before eating, drinking smoking, or going to the bathroom at breaks!!

Inhalation (Lungs)

- Inhalation exposure can occur
- When using
  - Wettable powders
  - Dusts
  - Gases, vapors
  - Sprays
- While mixing and loading
- During applications



Steps to take:

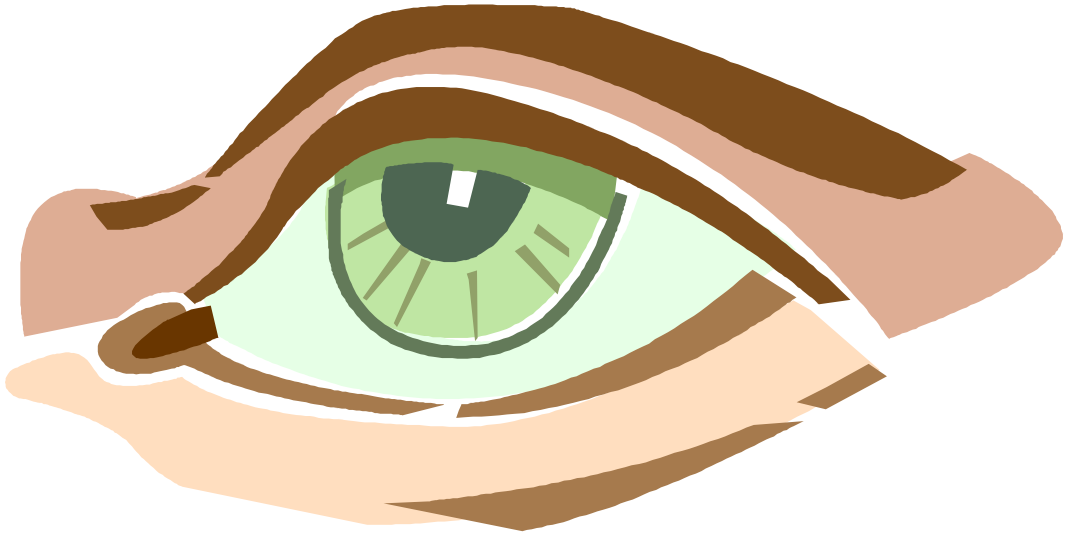
1. Move victim to fresh air
2. Loosen tight clothing
3. Seek medical attention

Ocular or eye exposure

- Eyes are able to absorb surprisingly large amounts of chemical

Steps to take:

1. Remove any contact lenses
2. Rinse eyes quickly and gently with clean water for 15 minutes or longer



Appearance of effects

- Acute toxicity effects
- Delayed effects
- Chronic toxicity effects

An acute effect..

- Occur from a single exposure
- Develops within 24 hrs of exposure
- Usually expressed as LD_{50} or LC_{50}

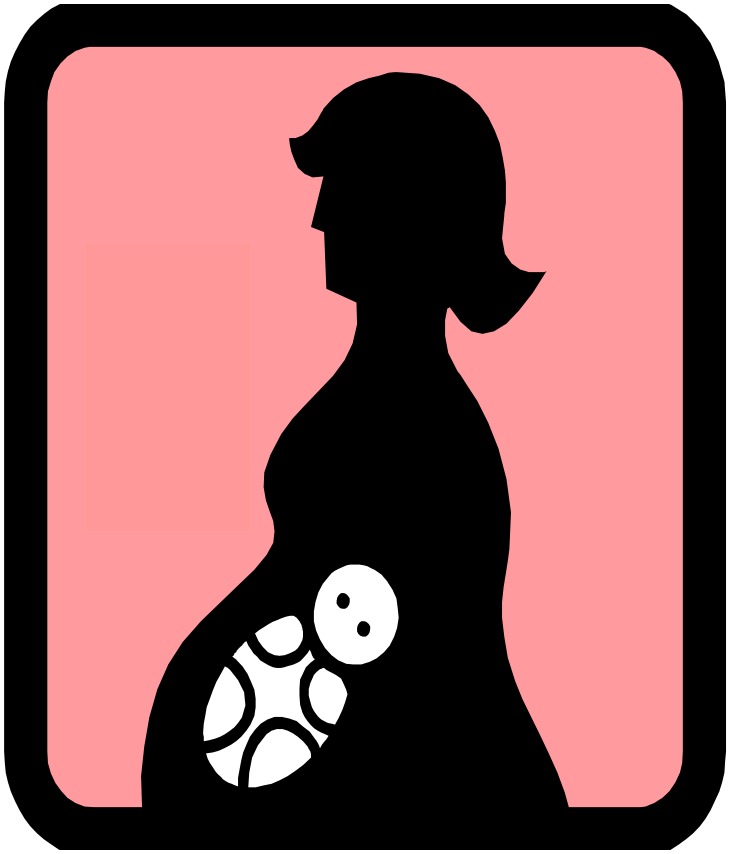
Delayed effects..

- After 24 hrs
- After repeated exposures

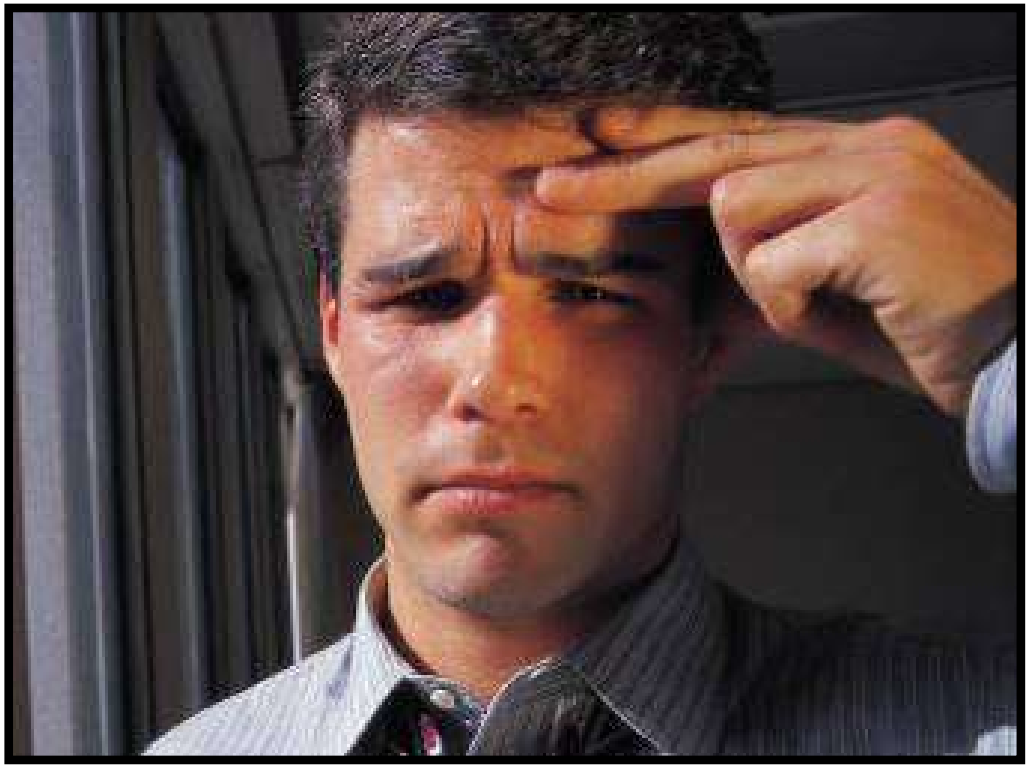
For example, multiple low dose exposure to to organophosphate and carbamate insecticides

Chronic effects

- Low dose exposures over an extended period of time
- Effects include
  - Birth defects
  - Toxicity to a fetus
  - Production of tumors
  - Genetic changes
  - Blood disorders
  - Nerve disorders
  - Reproductive effects



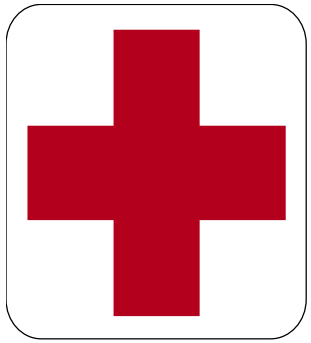
How to recognize symptoms?



Varies, according to the pesticide and the individual

Rash, headache, nausea, dizziness

If exposure occurs, administer first aid



- Dilute the pesticide
- On skin: remove contaminated clothing, wash skin, gently dry and loosely cover
- In eyes: wash across the eyes for 15 minutes
- If inhaled: get victim to fresh air and laid down
- If ingested: induce vomiting EXCEPT.. (read the label) and administer activated charcoal in water
- **DO NOT USE syrup of ipecac** – ineffective!

Seek medical attention

Take the label

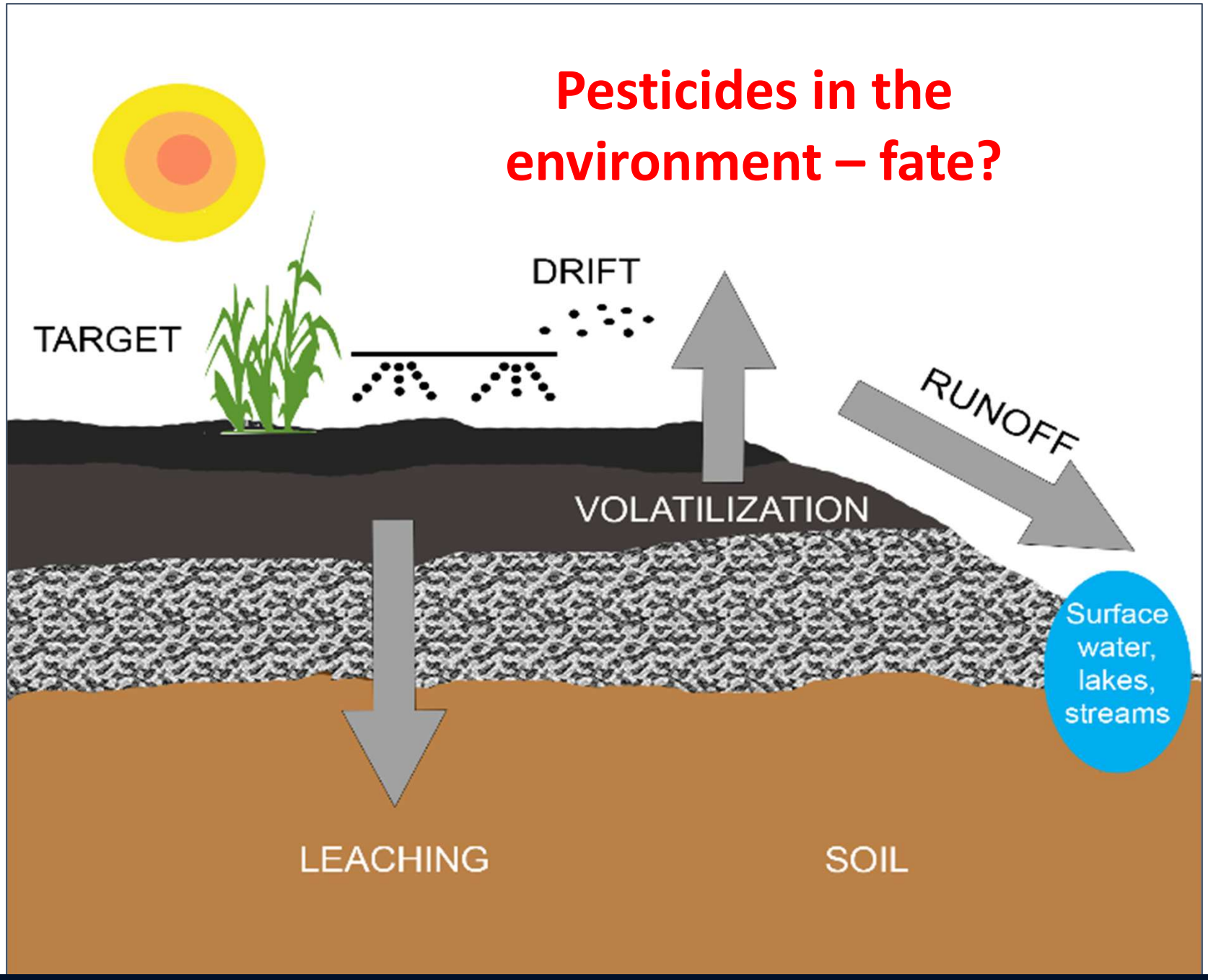
Keep extra copies of the label (and MSDS, now SDS) in your vehicle and office for emergencies!!

4. The environment and pesticides

- Air, soil, water, plants, animals, people, buildings
- Beware of beneficial organisms, endangered species, water, and people
- There is significant concern about the effects of pesticides on the environment

PSEP, Univ. of Georgia

Pesticides in the environment – fate?

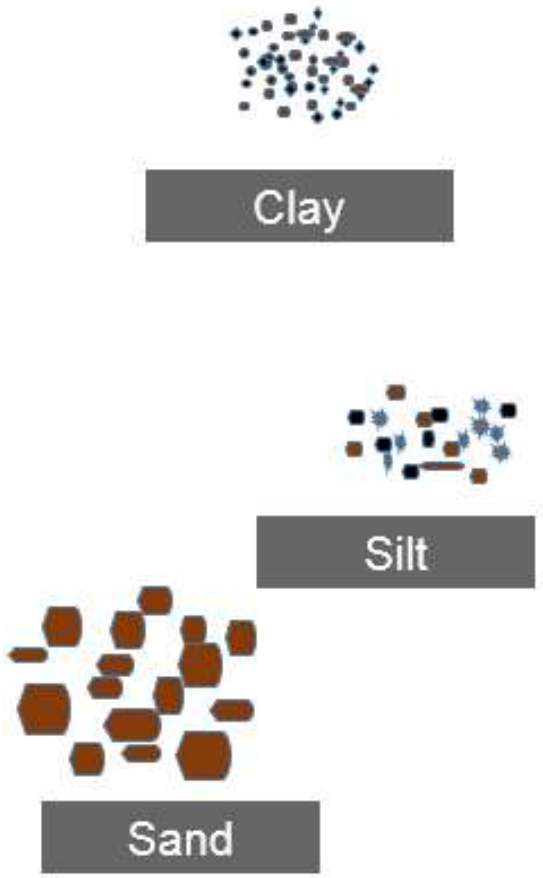


Pesticide characteristics

- Solubility – Dissolves easily in water,

Pesticide characteristics

- Solubility –
- Adsorption – Tightly attached (strongly adsorbed) to soil particles
  - Soil texture, structure, permeability
  - Soil pH, organic matter
  - Slope
  - Moisture, rainfall



PSEP, Ohio state university

Pesticide characteristics

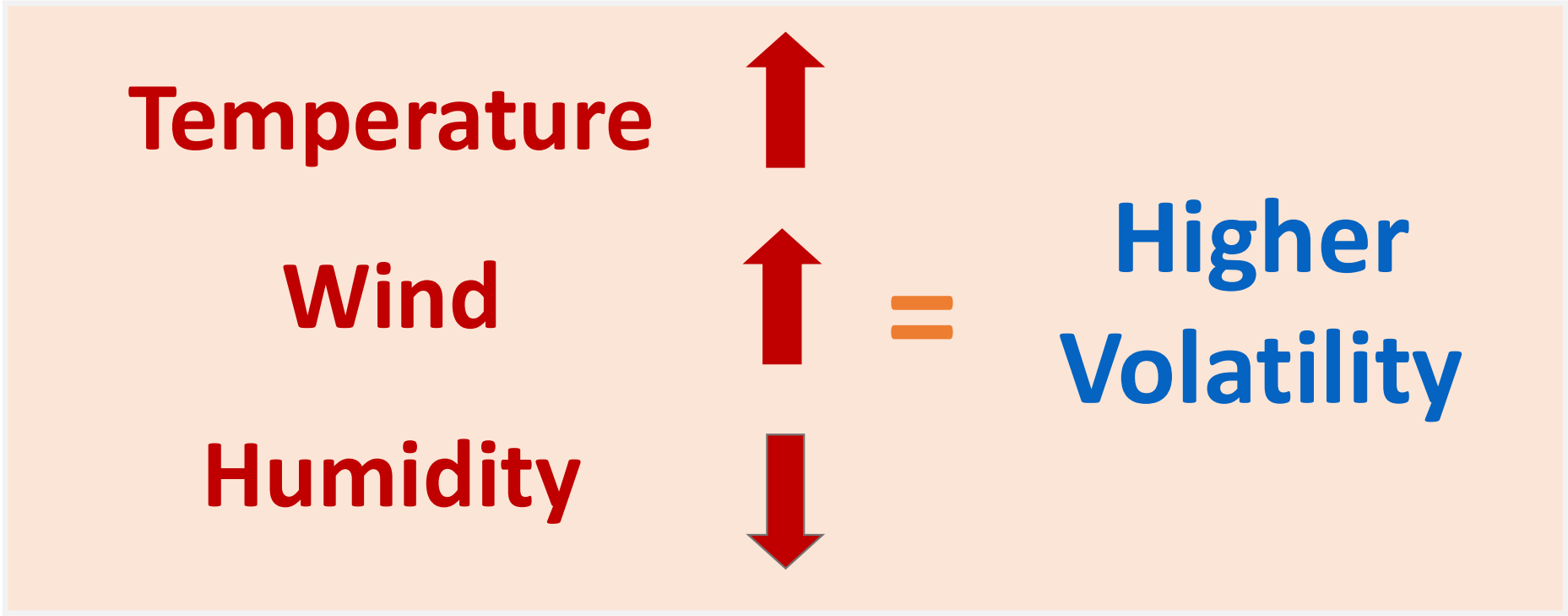
- Solubility –
- Adsorption –
- Persistence – Decomposes slowly and remains active in the environment long after application, providing continued pest control

Pesticide characteristics

- Solubility –
- Adsorption –
- Persistence –
- Volatility – Tendency of the pesticide to turn into a gas or vapor

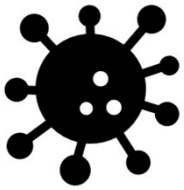
Pesticide characteristics: Volatility

- Volatility – Tendency of the pesticide to turn into a gas or vapor



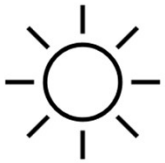
Pesticide degradation

Microbial



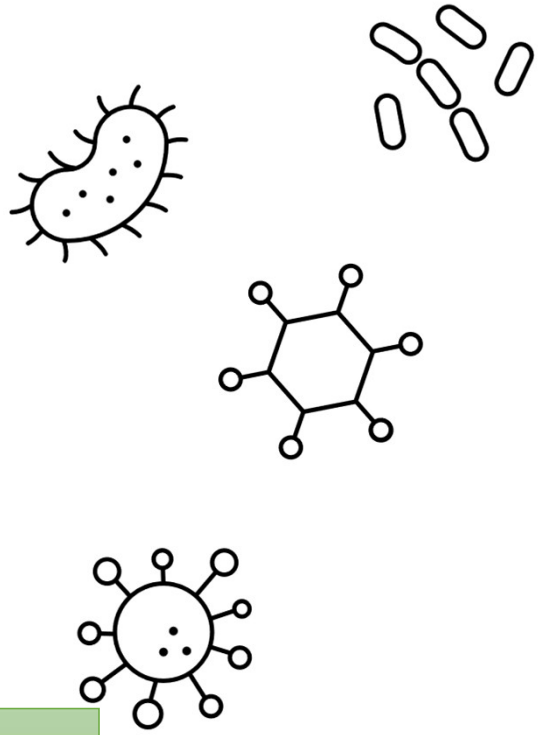
Chemical

Photo



Microbial degradation

- Important means for degradation
- Some microbes use them as food
- Warm soil temp, moisture, fertility, pH, adsorption, and aeration



How adsorption influence?

Chemical degradation

- Non-living processes
- High pH can break down
  - In soil
  - In tank mix water
- Soil properties and conditions affect the rate and type of chemical reactions

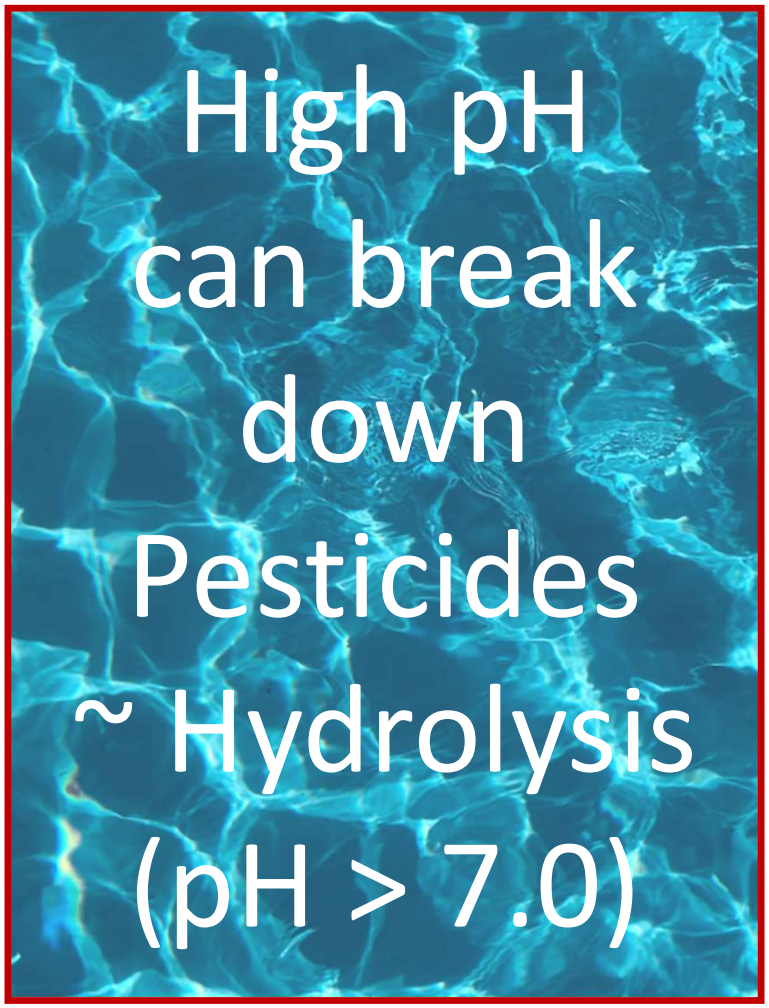


Photo by Artem Militonian on Unsplash

Photo degradation

- Breakdown of pesticide by sunlight
- Maybe reduced by soil incorporation

Photo by Tom Hauk on Unsplash

Factors affecting pesticide movement

- Pesticide's chemical characteristics
- Pesticide user's practices
- Surface character of the application site
- Soil type at the application site
- How deep the water table is and the permeability of the local bedrock

Ways pesticides move

- By air
- Spray drift, vapor, & dust particles
- By water
- Surface runoff
- Movement through soil
- By other objects
- Residues on plants and animals
- On equipment, products, and supplies

Pesticide movement – By air

- Spray drift
- Defined as airborne pesticide droplets that move off target/ application site
- Check label for drift management
- Spray drift is influenced by
  - Droplet or particle size
  - Height and direction of release
  - Temperature and humidity

https://pesticidestewardship.org/

Major drift factors

1. Applicator attitude
2. Weather conditions
3. Equipment set-up

Bob Nichols: USDA

Applicators attitude

- Assess the sensitive sites near application areas
- Assess weather conditions: stability, wind direction and speed
- Set up equipment with appropriate settings
  - Correct nozzles and pressures for sprayers
  - Decide speed and gate width for granular applications
- Make final decision: "**to spray of not**" that is the questions

Weather conditions

- Read the wind

-What's the downwind? **Direction**

- How far will it move? **Speed**

- 0-3 mph: Could be stable
- 4-7 mph : Manage for off-target movement
- >7 mph: Carries more material movement downward

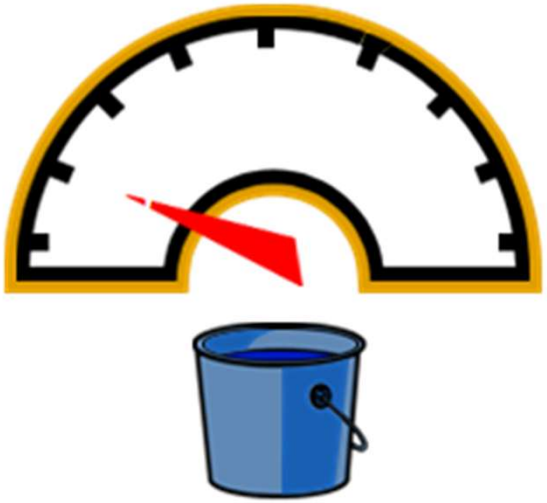
Equipment setup

- Appropriate nozzle size and pressure
- Use lower pressures
  - Except with certain nozzles
  - Drift potential increases as distances increases
- Use nozzles that produce **medium** and **coarse** droplet sizes
  - Smaller orifice = smaller droplet

Equipment setup- Spray pressure

- Must increase pressure 4 times to double nozzle output – consider drift when changing pressure

Sprayer pressure at 10 psi



Sprayer output 1 bucket

Sprayer pressure at 40 psi

Sprayer output 2 buckets

Equipment setup – Boom height

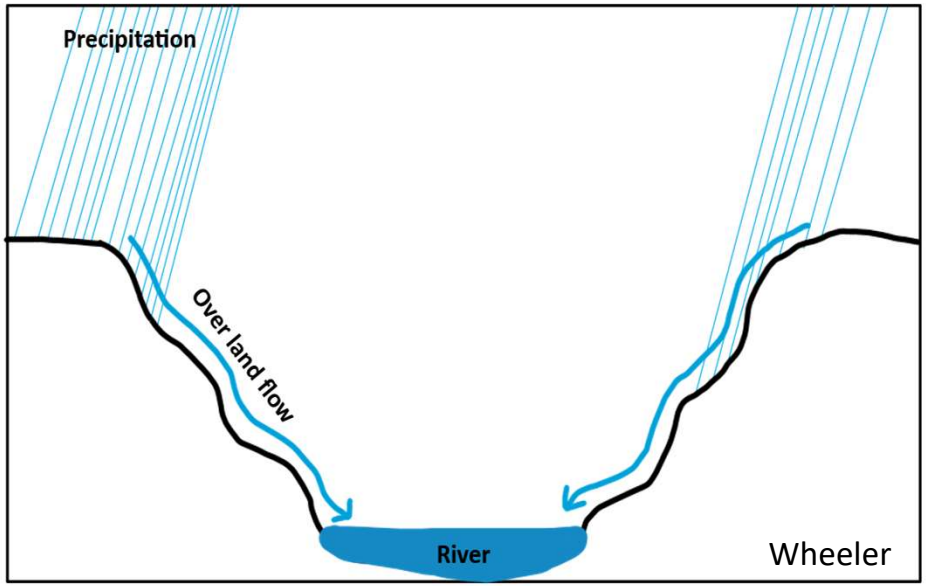
- Reducing the distance droplets must fall before hitting the target site reduces drift potential
- This rule applies to all types of applications

PSEP, Univ. of Georgia

Pesticide movement: In water

Runoff

- Pesticides move in water over soil into surface water
- Contaminated ditches, streams, rivers, ponds, and lakes
- Surface water used for drinking and livestock water, irrigation, etc



Runoff amount depends on:

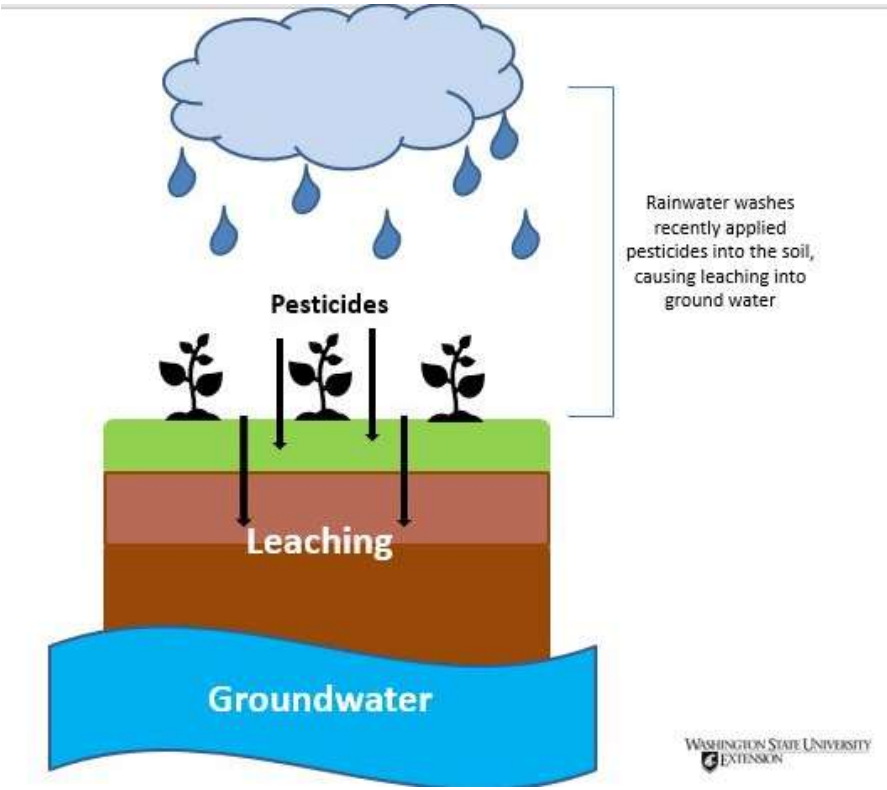
- Soil moisture
- Amount and timing of irrigation/rainfall
- Pesticide chemical characteristics
- Grade or slope of the area
- Soil texture
- Vegetation




Pesticide movement: In water

Leaching

- Movement of pesticide by water through soil
- Move horizontally to nearby roots or vertically towards groundwater
- Chemical characteristics



Leeching depends on..

- Geology – how permeable is the soil?
- Soil texture and structure
- - Sandy: fast percolation
- -Silt, clay or organic matter
- Depth to groundwater: shallow water tables pose a concern
- Amount and timing of rainfall or irrigation

Protect water sources

- Mix and load site location
- Spills
- Post application run-off
- Dispose of wastes properly

Protect non-target organisms

- Plants
- Bees, other pollinators
- Other beneficial insects
- Fish and other wildlife
- Humans
- Threatened & endangered species

Thank you..

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