

1 **Handling Pesticides Safely**

Master Gardener Training

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2 **Preview**

- What is a "pesticide"?
- What problems could it cause?
- How could it be used safely?

What do you want to know?

3 **What is a "pesticide"? 1**

A chemical ...

... intended to control a pest.

4 **What is a "pesticide"? 2**

... or, intended to "disinfect"

- *Disinfectants* • *Sanitizers* • *Antimicrobials*

5 **What is a "pesticide"? 3**

... or, intended to control plant growth

- Stimulate rooting of cuttings
- Retard growth of hedges and ground covers
- Retard sprouting of potatoes
- Limit growth of 'mums, Poinsettias
- Promote flowering → fruiting
- Promote fruit ripening/coloring
- Promote fruit enlargement

"Plant growth regulators"

6 **What is a "pesticide"? 4**

... or, intended to repel "pests"

7 **What is a "pesticide"? 5**

... or, intended to attract & poison pests

8 **What is a "pesticide"? 6**

... or, intended to preserve things

- *Wood*
- *Fuel*
- *Paints ("coatings")*

9 **What is not a pesticide?**

- Worming medication for pets & livestock
- Fertilizer

- Soil amendment such as horticultural lime*
- “Surfactant”, e.g., “spreader”, “sticker”
- Solvents
- Detergents, other cleaning agents

10 **Formulations** ¹

- “Formulation” is the stuff in the container
- Active ingredients + inert ingredients
- Solid or fluid

11 **Formulations** ²

- Ready-to-use
- Powder
- Liquid
- Gel
- Granular
- Pellets
- Tablets
- Dust
- Pet collar

12 **Application Methods**

- Spray it.
- Sprinkle it.
- Dribble it.
- Drop it.
- Place it.
- Squirt it.
- Draw a line with it.

13 **What may be treated?**

- Crops & Animals
 - Gardenia • Eggplant • Tangerine
 - Dog • Cat • Chicken • Goat
- Sites
 - Lawn • Fence line • Kennel
- Objects
 - Cabinet • Lumber • Toilet
- Only things named on product label.

14 **Pesticide Residue** ¹










- Whatever chemical remains
 - After application
 - ...Crop • Animal • Object • Site
 - After spill, leak
 - ...Floor • Cabinet
 - ...Air • Soil • Water

15 **Pesticide Residue** ²

¹ BENEFIT

² ➤ Harvest more

- Flea control
 - __?__
 - 3 RISK
 - 4 ➤ Stink!
 - Skin irritation
 - __?__
- 16 **Pesticide Residue** ³
- 1 Dissipate
 - 2 Accumulate
 - 3 Move
- 17 **Pesticide Residue** ⁴
- Dissipate
 - Wear-off & break down*
 - Rain & wind
 - Fungi, bacteria, & algae
 - Moisture, light, & oxygen
 - Accumulate
 - Resist dissipating
 - Additional residue
- 18 **Pesticide Residue** ⁵
- Move
 - "Spray drift" & "Vapor drift"
 - With moving air
 - Run off
 - With water flowing down slope
 - Leach
 - With water seeping downward through soil
 - Transport
 - By people sending treated things to market
- 19 **Problems** ¹
- Concerned neighbors & passers-by complain about:
 - Health risks (for themselves, children, pets), if drift and excess residue
 - Damage to valuable plants & objects
 - People who handle pesticides risk illness & injury
- 20 **Problems** ²
- People who walk through, live, work, play in treated areas risk illness & injury
 - Improper disposal
 - Empty container
 - Old pesticide product
 - Unwanted pesticide product
 - Extra spray mix
- 21 **Pesticide users are regulated** ¹
- Pesticide labels were checked and registered by the U.S. Environmental Protection Agency.
 - As proof, each pesticide label lists an "EPA Reg. No."

- 22  **Pesticide users are regulated** ²
- Each pesticide label lists the misuse statement.
- 23  **Pesticide users are regulated** ³
- The “misuse statement” means we are legally obligated to read & heed the label.
 - Especially, the Do's and Don't's when ...
 - ...Storing a pesticide
 - ...Diluting and applying a pesticide
 - ...Disposing of a pesticide container or unused pesticide
 - This rule applies to gardeners, too.
- 24  **Risk management** ¹
- Risk \approx Toxicity & Exposure
 - Toxicity of pesticide cannot be changed.
 - Exposure to the pesticide can be managed to reduce the risk of causing problems.
- 25  **Risk management** ²
- | | |
|--|--|
| <p>Low <u>toxicity</u> pesticide</p> <p>× Plenty of <u>exposure</u></p> <hr style="width: 100%;"/> <p>☹ High <u>risk</u> of harm</p> | <p>High <u>toxicity</u> pesticide</p> <p>× Very little <u>exposure</u></p> <hr style="width: 100%;"/> <p>☺ Low <u>risk</u> of harm</p> |
|--|--|
- 26  **Risk management** ³
- Signal word on product's label is about short-term toxicity to people
 - Each product's label shows one of these:
 - “CAUTION” for low toxicity product
 - “WARNING” for moderate toxicity product
 - “DANGER” for high toxicity product
 - *Some* products show  and the word POISON (in red letters) along with “DANGER”.
- 27  **Risk management** ⁴
- Pest manager's choices
 1. Wear protective clothing and equipment specified by label
 - Will not make you superhuman!
 - Less exposure → Lower risk
 2. Practice proper pesticide handling
 - Less exposure → Lower risk
 3. Choose pesticide with lower toxicity rating
 - Lower toxicity → Lower risk
- 28  **Risk management** ⁵
- Pest manager's choices
 4. Don't use a pesticide
 - Zero risk of harm
 - What if you don't control the pest?
 - “So what” if the pest does its thing?
 - Public health pest!
 - What if non-chemical control method is riskier?
- 29  **Risk management** ⁶
- Pest manager's choices

5. Use application equipment made specifically for safety

- Less exposure → Lower risk
- “engineering control”

Picture of red plastic
sprayer nozzle shield
(not shown)

30  **Risk management** ⁷

- The pesticide label tells how to lower risk.
- So review the section,
Hazards to Humans and Domestic Animals

31  **When advising** ¹

- Be sure you and your client are talking about the same pesticide product.
 - Beware of products with similar names, like “Roundup Ready-to-Use...” and “Roundup Concentrate...”
- ID a pesticide by both product name (“brand name”) and EPA Registration Number.
 - Both appear on the product’s label.

32  **When advising** ²

- Example of similar brand names and different EPA Registration Numbers

33  **Lessen Problems** ¹

- Heed any waiting period after treatment ...
 - ... before harvest
 - ... before entering treated area
 - ... before planting
- Communication
 - Pesticide user should warn others
- Drift control (more later)

34  **Lessen Problems** ²

- Protective clothing & safety gear
 - Wear whatever label requires.

35  **Lessen Problems** ³

- Choice of pesticide
 - Before you buy, ask yourself these questions:*
 - “Target pest”?
 - Toxicity?
 - Protective clothing?
 - Safety equipment?
 - Waiting periods?
 - Size of pesticide container?

36  **Read the Label First!** ¹

- Label contains manufacturer’s experience, condensed and in writing.
 - It’s worth a “million bucks”!
- List of legal uses, like these examples:
 - CROP: Shrubs • Radish • Citrus trees
 - SITE: Lawn • Closet • Fence line
 - ANIMAL: Dog • Cat • Horse
 - OBJECT: Toilet bowl • Pruning shears

37  **Read the Label First!** ²

- Do's & Don'ts reduce risk, explaining
 - how to protect yourself & others (esp. children), pets, wildlife
 - how to not to contaminate our air, water, and soil & not to poison wildlife
- Before you buy the product
- Before you apply the product
- Before you store the product
- Before you dispose of the empty container

38 **Parts of a Label** ¹

- ✓ Brand name?
- ✓ EPA Reg. No.?

39 **Parts of a Label** ²

- Signal Word on each product label is either:
 - CAUTION, or
 - WARNING, or
 - DANGER

CAUTION—relatively low toxicity

WARNING—relatively moderate toxicity

DANGER—relatively high toxicity

40 **Parts of a Label** ³

- Precautionary Statements
 1. Environmental Hazards
 2. Hazards to Humans and Domestic Animals
 3. Physical and Chemical Hazards

41 **Parts of a Label** ⁴

- Hazards to Humans and Domestic Animals
 - Explains any required protective gear
 - e.g., "Applicators and other handlers must wear a long-sleeved shirt, long pants, shoes and socks, and gloves."
 - Explains signs & symptoms of overexposure (if any are expected)
 - e.g., "May cause irritation of nose, throat, eyes and skin."

42 **Parts of a Label** ⁵

- Directions for Use
 - Misuse Statement is always on the label
 - Do's & Don'ts
 - Waiting periods
 - "Do not allow children or pets to enter treated areas until sprays have dried."

43 **Parts of a Label** ⁶

- Directions for Use (continued)
 - Storage & Disposal

44 **Parts of a Label** ⁷

- Directions for Use (continued)
 - Do not apply a higher dose than allowed by the label.
 - If the label specifies 1 – 2 ounces per 1,000 square feet, applying 3 ounces per 1,000 square feet would be a misuse.
 - Do not apply an under-diluted mixture.
 - If the label specifies 1 – 2 tablespoons per gallon of water, applying a mixture of 3 tablespoons per gallon of water would be a misuse.
 - Either may leave excess residue at harvest; or harm or damage to the things you want to protect from pests.

45 **Drift Management** ¹

- Drift occurs when wind carries spray droplets or dust particles beyond the area being treated.
 - It happens during application.
- Drift might harm people, pets, or wildlife in “sensitive areas”.
 - “Sensitive areas” are places like schools, parks, fishponds, and wildlife preserves.

46 **Drift Management** ²

- Complaints
 - Illness
 - Damage to nearby plants or objects
 - Contamination of nearby living areas or food plants
- Investigation and citation
 - Inspectors from Pesticides Branch, State Department of Agriculture may investigate → citation, penalty.

47 **Drift Management** ³

- Drift management techniques
 1. Delay spraying until less windy.
 2. Stop spraying when wind blows toward “sensitive area”.
 3. Place shield around nozzle.
 4. Use granular or pellet formulations, if practical, as substitute for dust or sprayable formulations.

48 **Drift Management** ⁴

- Drift management techniques (continued)
 5. Spray at a lower pressure.
 - Makes more large droplets and less small droplets.
 6. Don't spray upwards.
 7. Move nozzle closer to ‘target’.

49 **Drift Management** ⁵

- Drift management techniques (continued)
 8. Buffer zone
 - “No-spray zone”
 - Between the area being treated and sensitive area.

50 **Safety begins with the label**

- Before you buy a pesticide, read the product label.
 - What crop, animal, object, or site may be treated?
 - Will the pesticide control the pest?

- Do's and Don'ts such as:
 - Necessary application equipment
 - Necessary safety equipment
 - Waiting periods after applying the pesticide

51 **Disposal**

- Empty container
 - Liquid product – “triple rinse”
 - Solid product – empty completely
 - Emptied container → Rubbish (“solid waste”)
- Unwanted product
 - Give away to responsible user
 - Take to “hazardous waste” collection site
- Call Hawaii Dept. of Ag. for advice

52 **Is it important?**

- It's about the balance: Risks & Benefits.
- Treat here? Treat now?

53

Review parts of [specimen label](#).

54 **Review 1**

- Which of these is not classified as a pesticide?
 - Molluscicide
 - Herbicide
 - Wood preservative
 - Paint stripper

55 **Review 2**

- The “signal word” on a pesticide label tells the user about the:
 - product's short-term toxicity to humans.
 - product's short-term toxicity to birds and fish.
 - type of protective clothing to wear.
 - risk of polluting streams, lakes, ponds, or reservoirs.

56 **Review 3**

- A pesticide with a label showing the signal word “CAUTION” :
 - provides least effective pest control.
 - is the least toxic to people.
 - presents least drift problems.
 - sells at the lowest unit price.

57 **Review 4**

- The formulation of pesticide that presents the least risk of drift is:
 - granular.
 - gel.
 - powder.
 - ready-to-use aerosol.

58 **Review 5**

- The type of pesticide movement that occurs during application is:

- residue transport.
- leaching.
- run-off.
- drift.

59 **Review 6**

- A pesticide label is a list of:
 - treatments suggested by the pesticide's manufacturer.
 - treatments allowed by regulatory agencies.
 - pests that can be controlled by the pesticide.
 - advertising claims and common-sense advice.

60 **Review 7**

- At a home with children, store pesticides:
 - on a shelf 5 feet above floor level.
 - in an cabinet secured with a lock.
 - behind look-alike containers of chemicals.
 - beneath the sink in the bathroom.

61 **Review 8**

- The risk of being harmed by a pesticide depends on the pesticide's toxicity and the:
 - applicator's age & reading ability.
 - amount & duration of exposure.
 - application equipment & technique.
 - formulation & concentration of the pesticide.

62 **Review 9**

- Which of these does not involve possible exposure to residue?
 - Days-to-harvest
 - Days-to-planting
 - Re-entry restriction
 - Shelf-life

63 **PAU!**