

Pesticide Use and Delivery



Pesticide use and delivery

- Concepts of toxicity, hazard
- The label and the law (restricted vs general use)
- Reading the label for personal safety protection
- Choosing pesticides of least toxicity to human
 - Minnesota book lists, Ohio lists
- Reading the label to find out how much to use
- Web resources (Purdue pesticide label program)
 - Minnesota guide, Ohio, Cornell Recommends..

Which of the following is a poison:

- Table salt
- Aspirin
- Malathion
- Sevin

“The dose makes the poison” (Paracelsus)

How to compare hazards of pesticides?

- What properties of a pesticide makes it hazardous?
 - **Acute Toxicity** - innate property of material
 - Rat Oral LD 50 – Lethal oral dose to 50% of population of rats (mg pesticide/kg body weight)
 - Dermal LD 50 – Lethal dermal dose as above
 - Respiratory LD 50 – Lethal inhaled dose as above
 - **Exposure** – extent to which subject is exposed to pesticide.

Hazard = toxicity * exposure

Kinds of exposure

- Acute –single exposure
- Chronic –long term repeated exposure

The Pesticide Label- a legal document

- Use Restriction
- Brand (Trade Name)
- Formulation
- Concentration of material
- Common name of active ingredient
- Chemical name of active ingredient
- Signal word

<http://www.btny.purdue.edu/Pubs/PPP/PPP20.html#label>

Signal words and toxicity

Signal Word	Dermal LD	Skin Effects
	50 mg/kg	
Danger	Up to 200	corrosive
Warning	>200 to 2000	Severe irritation at 72 hrs
Caution	>2000	Mild to moderate irritation

Signal words and toxicity

Signal Word	Oral LD 50 mg/kg	Amount which might kill
Danger	Up to 50	A taste to a teaspoon
Warning	>50 to 500	A teaspoon to an ounce
Caution	>500	Greater than an ounce

The Pesticide Label

- Re-entry information
- Identifies target pests
- Tells how and where it can be used
- Mixing instructions

<http://www.btny.purdue.edu/Pubs/PPP/PPP20.html#label>




Formulations

- Dusts (D)
- Liquid concentrates (E or EC)
- Wettable (W or WP)
- Flowables (F)
- Granules (G)
- Oil emulsions
- Aerosol sprays
- Baits
- Fumigants

Concentration of pesticides

- Dry formulations are usually % active ingredient (ai) by weight
 - 20 WSP= 20% ai; eg 20 gm ai in 100 gm
 - 10 G = 10% ai; eg 1 lb ai in 10 lb product
- Wet formulations are usually in lbs ai per gallon
 - 4 EC= 4 lbs ai in 1 gallon
- RTU= Ready to use

Kinds of Rates

-  Spray a given concentration of active to run-off.
-  Deliver a liquid at a rate of a_i per acre or per 1000 sq ft
-  Deliver a granule at a rate per acre or per 1000 sq ft

Toxicity of common insecticides

National Pesticide Information Retrieval System (Label and MSDS Source)

- <http://state.ceris.purdue.edu/>

Toxicity of common insecticides

<http://www.entomology.umn.edu/cues/IPM-Pesticides/IPM-pesticides.html>

http://ohioline.osu.edu/b504/b504_9.html

Pesticides and personal safety

Personal protective equipment (REI)

http://www.btny.purdue.edu/Pubs/PPP/PP_P38.html

Common safety tips

http://www.btny.purdue.edu/Pubs/PPP/PP_P20.html#safety

Injectables

- Somewhat controversial, but can be effective

Into tree injections : Mauget and others

- http://ohioline.osu.edu/b504/b504_5.pdf

Into soil injection: low volume (Kioritz),
high volume (standard soil injection)

- <http://www.rittenhouse.ca/asp/Product.asp?PG=700&hlink=true>

Example 1: Apply as liquid at a given concentration to runoff.

1. Read the label to determine rate of application

Eg 0.1 lb ai/100 gal

2. Determine concentration of material in the purchased bag of product. 10WP = 10% by weight

3. Determine amount product needed in to get 0.1 lb .

$X * 0.1 \text{ ai /lb product} = 0.1 \text{ lb product}$

$X = 1 \text{ LB needed}$

Example 1: Apply as liquid at a given concentration to runoff.

- Determine amount product needed to put into 10 gal when rate is given per 100 gal

Set up and solve for X

$$\frac{1 \text{ lb product}}{100 \text{ gal}} = \frac{X \text{ lb product}}{10 \text{ gal}}$$

Cross multiply to solve for x

$$10 = 100X$$

$$0.1 = X = \text{pounds product needed in 10 gal}$$

Example 2. Applying rate of pesticide to per unit area

Rate is 0.1 lb ai/acre and you have 10 WP

- See this link

http://www.btny.purdue.edu/Pubs/PPP/PP_P-47.pdf


Principles pp 6-8

Details pp 24-27

Applying on a per area basis

0.1 lb ai/acre

 Determine amount of product you need to treat an area 66' x 66'.

 How big is your area? 4,356 sq ft

 How does that relate to label rate?

Solve for X

0.1 lb ai = X lb ai needd

43560 sq ft 4356 sq ft

0.01 lb ai = X

Applying on a per area basis

0.1 lb ai/acre

2. How long does takes to cover your area with application equipment when walking or riding at constant speed while delivering a given rate of product per minute.
3. Put enough ai in tank to match this time.