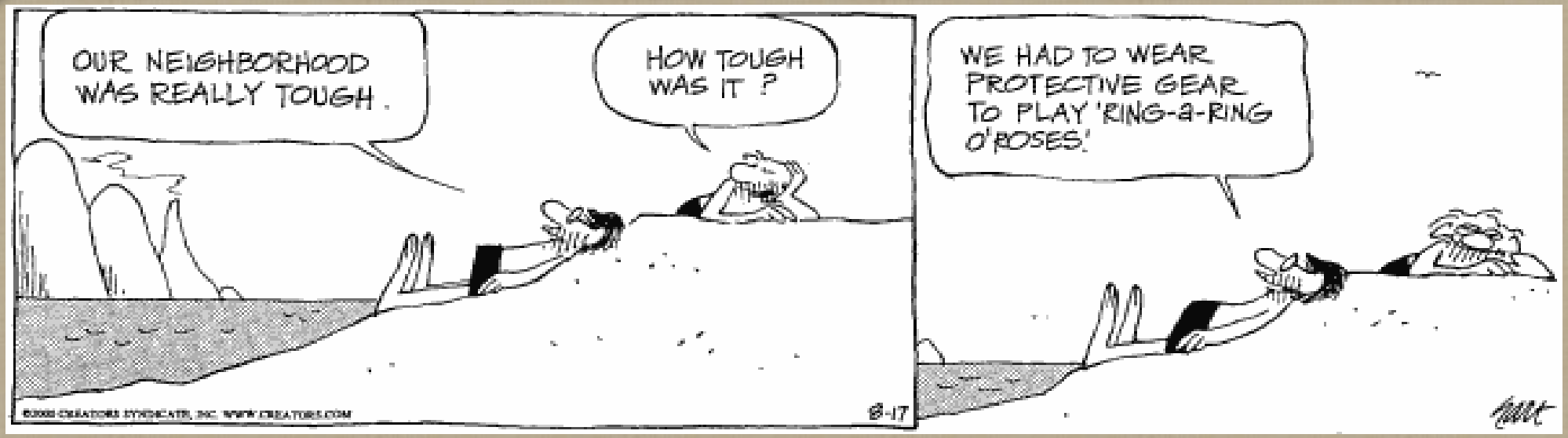
Nursery Pesticide Regulations and their usage in Seedling Production

Federal Laws & Regulations Background

I. Introduction

A. Pests in History:

1. Irish potato famine: 1845 - 1851, result of massive infection of *Phytophtora infestans,* now called late blight.



By permission of Johnny Hart and Creators Syndicate, Inc.

2. Black Death or bubonic plague: more than 130M have died from this disease, transmitted by a rat flea.

- Death rate was 90%, took 1 week
- Robert Boyle and Isaac Newton (1600's)

Ring a-round the roses,
A pocket full of posies,
Ashes! Ashes!
We all fall down!

3. Malaria: Annual death rate been reduced from 6M in 1939 to 2.5M in 1965 to about 1M in 1991. Parasite, *Plasmodium* spp.

4. Yellow Fever: 19th Century in the Panama Canal abandoned by French because more than 30,000 laborers died (viral disease).

5. Present: 1991 - Western Nile Virus (mosquito vectored - NY); 5 people Eastern Equine Encephalitis in Florida, 2 died. Transmitted by Asian tiger mosquito. Lowndes County Agent.

Background (cont.)

B. PESTICIDES IN HISTORY:

1. Children of Israel: used salt to desiccate land they took over.

2. Homer: the Greek poet, referred to the burning of sulfur for fumigating homes

3. Pliny the Elder's : *Natural History*, written in AD70 has a summary of pest control extracted from the Greek literature of the preceding 200-300 yrs Most of the materials were useless and based on folklore.

4. By 900 AD: Chinese were using arsenic as an insecticide

5. 1600's: rotenone used to paralyze fish; tobacco as a contact insecticide

6. 1700's: Nicotine fumigation -- heating tobacco and blowing smoke; soap mentioned as an insecticide.

7. Mid-1850's when pests were first controlled with chemicals.
   a. Pyrethrums, lime and sulfur combinations
   b. arsenic, sulfur, mercuric chloride, & soaps were found effective between 1800-25.

WWII and The Chemical Age

A. DDT and WWII: Historical significance of DDT: defined the chemical age. Child of WWII.

- First uses: as a dust for soldiers, refugees and prisoners for lice (does not absorb into skin if in the dry formulation).

  -dieldrin, aldrin, endrin (toxic)
  -chlordane, heptachlor

B. Mid-1940's - Organophosphates

C. Misuse
- eradication programs
- too much of a good thing

D. Cancellation of most Chlorinated Hydrocarbons: came as result of Rachel Carson's book "Silent Spring" published in 1961.

1) DDT: was canceled in 1973, caused reduction in bird eggs. Did a lot of good, low mammalian toxicity.

2) Dieldrin: canceled in 1972

3) Aldrin: canceled in 1974

4) Endrin: 1984

PESTICIDE LAWS AND REGULATIONS

I. History of Legislation:

1. 1st Law: Federal Food, Drug, and Cosmetic Act (FFDCA) (Pure Food Law) of 1906.

2. 1910: Passage of Federal Insecticide Act, covered only insecticide and fungicide, there to protect farmer from fraudulent products.

3. 1938: Pesticide amendment to Pure Food Law (1906), preventing contamination of food with pesticides.

4. 1947: Federal Insecticide, Fungicide, Rodenticide Act (FIFRA)

5. 1954: Miller amendment to FFDCA (1906) set tolerance of all pesticide on raw food and feed products (Delaney Clause part of 1958 Food Additives Amendment).

6. 1970: EPA established, given responsibility for registration of pesticides instead of USDA.

7. 1985: Congress reauthorized the Endangered Species Act (originally in 1973).

FIFRA

A. FEDERAL INSESECTICIDE, FUNGICIDE AND RODENTICIDE ACT

1. 1947 - 1st enacted.

2. Purpose: Regulates the distribution, sale, and use of pesticides.

3. 34 Sections

- Sec. 1 Short title and Table of Contents
- Sec. 2. Definitions
- Sec. 3. Registration of pesticides
- Sec. 4. Re-registration of registered pesticides
- Sec. 5. Experimental use permits
- Sec. 6. Administrative review; suspension
- Sec. 7. Registration of establishments
- Sec. 8. Books and records
- Sec. 9. Inspection of establishments, etc.
- Sec. 10. Protection of trade secrets and other information
- Sec. 11. Use of restricted use pesticides; applicators
- Sec. 12. Unlawful acts
- Sec. 13 Stop sale, use, removal, and seizure
- Sec. 14. Penalties
- Sec. 15. Indemnities
- Sec. 16. Administrative procedure; judicial review
- Sec. 17. Imports and exports
- Sec. 18. Exemption of Federal and State agencies
- Sec. 19. Storage, disposal, transportation, and recall
- Sec. 20. Research and monitoring

- Sec. 21. Solicitation of comments; notice of public hearings
- Sec. 22. Delegation and cooperation
- Sec. 23. State cooperation, aid, and training
- Sec. 24. Authority of States
- Sec. 25. Authority of Administrator
- Sec. 26. State primary enforcement responsibility
- Sec. 27. Failure by the State to assure enforcement of State pesticide use regulations
- Sec. 28. Identification of pests; cooperation with Department of Agriculture's programs
- Sec. 29. Annual report
- Sec. 30. Min. requirements for training of maintenance applicators & service techs.
- Sec. 31. Environmental Protection Agency minor use program
- Sec. 32. Department of Agriculture minor use program
- Sec. 33. Severability
- Sec. 34. Authorization for appropriations

FIFRA – ALABAMA LAW

- Alabama Pesticide Act of 1971
  - Regulates the sale, distribution, transportation and use of all pesticides.
  - Requires annual registration of pesticides with the Dept. of Ag and Industries
  - Requires licensing of dealers who sell “restricted use” pesticides and permits for applicators.
  - Any person who violates any provision of the Act shall be guilty of a misdemeanor and fined upon being found guilty according to the law.

FIFRA – Criminal and Civil Penalties

- FIFRA makes provisions for both civil and criminal penalties for misuse by commercial applicators.
- Civil penalties cannot exceed $5,000 for each offense.
- Commercial applicators convicted of violating FIFRA are guilty of a misdemeanor and are subject to a fine of up to $ 25,000, one year in prison, or both.
- Commercial applicators are criminally liable for the acts of their employees.

FIFRA – Civil Penalties

- 1. Maximum penalty for misuse of a restricted use pesticide is $10,000.
- 2. Maximum penalty for misuse of a non-restricted use pesticide is $5,000.
- 3. Maximum penalty for a violation or any prohibited or unlawful act as described in Sec. 2-27-14, Code of Alabama (1975), is $5,000.
- 4. Maximum penalty for operating without a license is $5,000.
- 5. Maximum penalty for failure to keep books and records is $1,000.

FIFRA – Important Sections

A. Section 3 Registration: offer the registrant the most flexibility. To obtain a Sec. 3 registration, a registrant must submit data to support it. the primary advantage of Section 3 is the company is in control of its registration. Disadvantage is the cost – $25 - $50M for new chemistry.

B. Special Local Need (Section 24(c)) Registration: A special local need registration may be obtained by applying to the pesticide regulatory authority in the state. It first must go through the 24c committee (AU Extension Specialists). A completed "Application for Notification of State Registration of a Pesticide to Meet a Special Local Need (EPA Form 8570-25) is required.

- Must have a Section 3 on another site.
- If SLN for use on food or feed must have a tolerance or an exemption from EPA.
- Once state approves it, EPA will review it.
- 5 year limit???
- Show examples from the 24-c list

FIFRA

C. Emergency Exemption (Section 18) Registration: may be initiated by a state in response to an emergency pest situation. Starts with Section 18 committee (AU), goes to ADAI, then to EPA.

- Registrant usually no involved in this.
- Product does not have to be registered, can be under development (Pirate)
- Must have a permanent or temporary tolerance or exemption, EPA is real picky about this under FQPA.
- For 1 season and time-limited, detailed records must be kept and turned in to EPA by ADAI. Emergency must be declared by Commissioner of Agriculture (i.e. Ron Smith, tells ADAI and they declare it).
- Can be and often is for only a small portion of the state, i.e. central Alabama resistant TBW.
- Section 18's are hard to get these days

FQPA

FQPA was enacted in August of 1996

AMENDED:

1) The Federal Food, Drug & Cosmetic Act: food safety and tolerance

2) Federal Insecticide, Fungicide, & Rodenticide (FIFRA) Act: pesticide registration and use

Transportation of Pesticides

- DOT issues these rules for transportation of pesticides
  - 1. They must be in their original packages.
  - 2. The vehicle must have a correct sign. Manufacturers must put the correct warning signs on each package.
  - 3. The pesticides may not be hauled in the same vehicle with food products.
  - 4. You must contact the DOT immediately after each accident in which someone is killed, injured badly enough to go to a hospital, or when damage is more than $50,000.
  - 5. You must tell DOT about any spills during shipment.

Transporting Pesticides

Use tie-downs or brace bars.

Other Laws

VI. Federal Recordkeeping Law - Farm Bill of 1990. USDA/AMS is over this law.

VII. Other Federal Laws:

1. Clean Air Act: Nov, 1990 allows EPA to regulate air emissions.

2. Clean Water Act: 1997 reauthorized, non-point source AG. Pollution

3. Endangered Species Act: show county fliers

Other Laws

VII. Other Federal Laws:

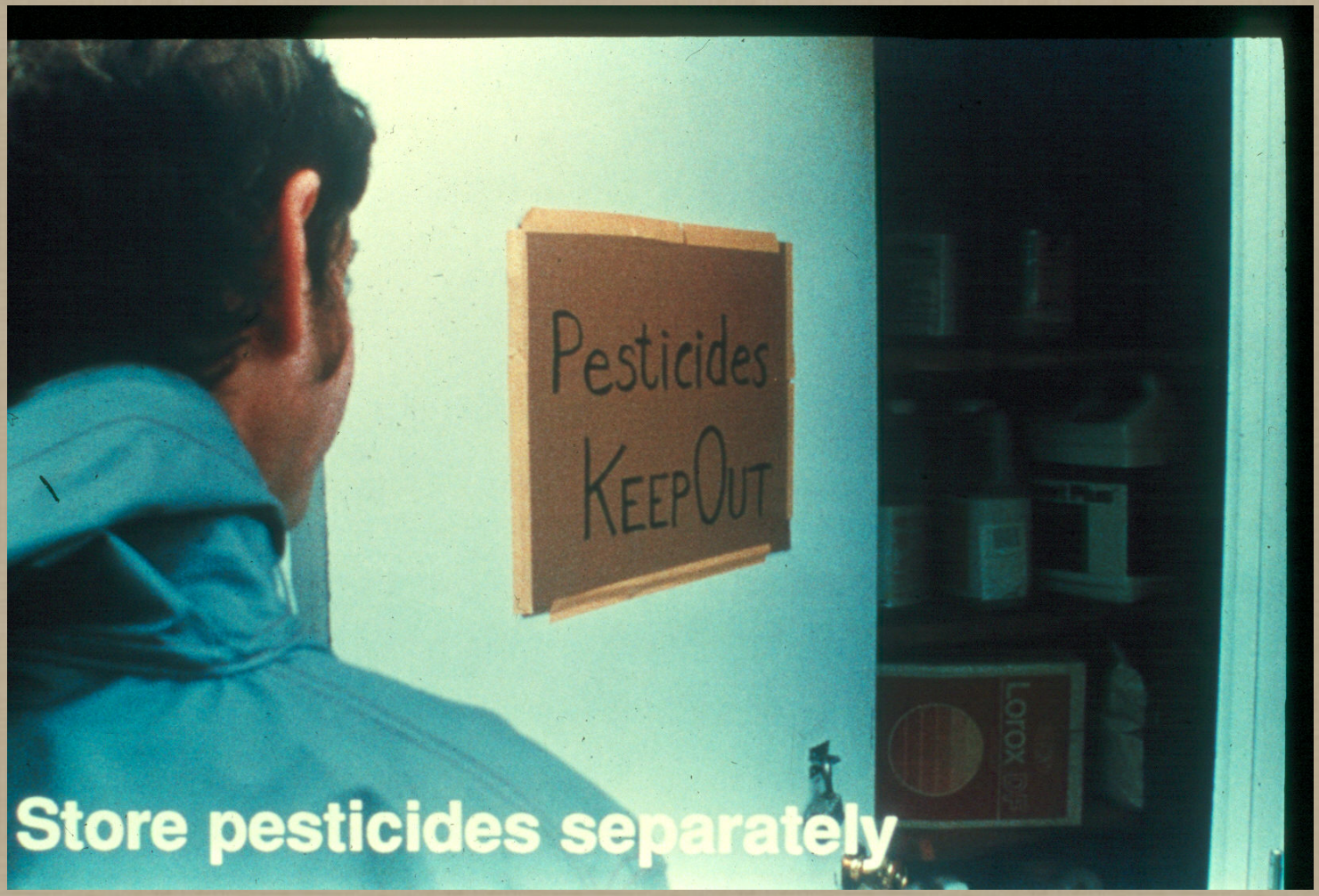
4. Resource Conservation and Recovery Act (RCRA) of 1976. Purpose: regulates the generation, treatment, storage, transportation, and disposal of solid wastes.

- Pesticide wastes: unused pesticides, rinsate, non-empty pesticide containers, pesticide residue consisting of contaminated soil, water and other debris resulting from the cleanup of a spilled pesticide.
- Basically covers hazardous waste

5. Superfund Amendments and Reauthorization Act of 1986 (SARA Title III): called "Emergency Planning and Community Right-To-Know Law."

- Emergency Notification: owners and operators of EHS to notify state and local EMA's when a spill occurs.

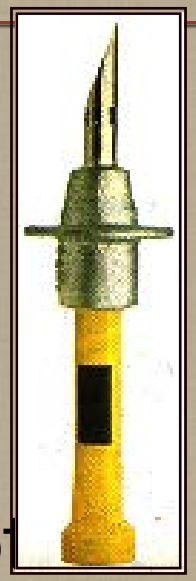
Storage Site Selection



Rinse Water

- Reapply to a labeled site immediately after rinsing
- Reapply to a labeled site after collecting and storing.
- Do not dump on ground, in ditches, septic systems or fencerows

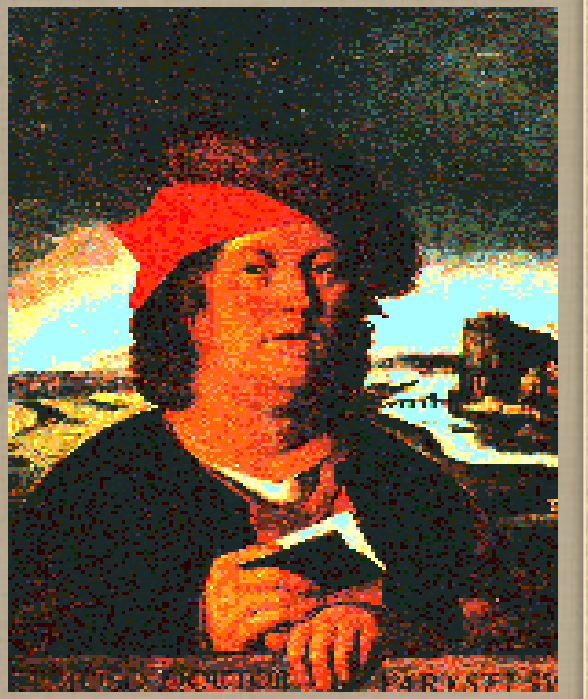
Empty Containers



- Triple or jet rinse immediately after emptying
- Turn in plastic containers for recycling
- Landfills - check with operator
- Do not burn containers
- Burying containers on your own pr[illegible]not recommended

Applicator Safety and Worker Protection Standards

Risk = toxicity x exposure



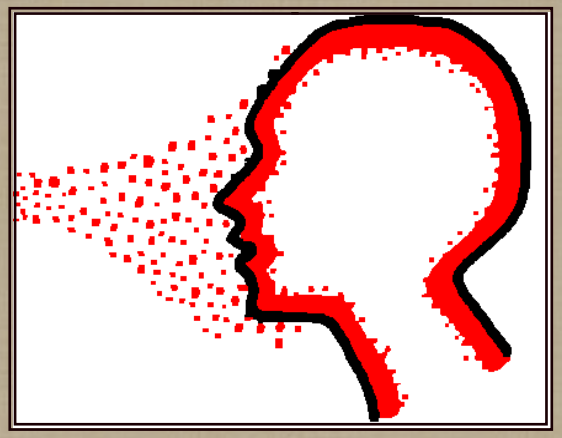
"The dose makes the poison" - Paracelsus (1493-1541)

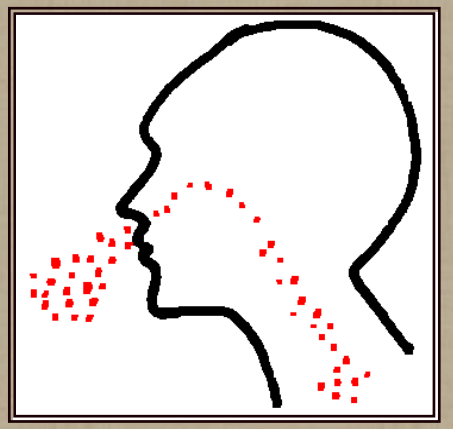
“All substances are poisons, there is none which is not.”

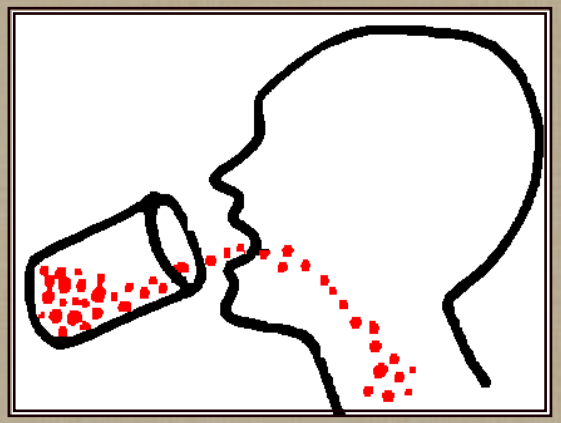
. . . Paracelsus ____ The "father" of modern toxicology.
More properly known as Theophrastus Phillippus Aureolus Bombastus von Hohenheim.

How Pesticides Enter the Body

- Skin (includes eyes)
- Breathing
- Swallowing







Absorption through the skin is the most common route of poisoning of agricultural workers.

This exposure can be reduced by 99% simply by wearing chemical resistant gloves and a long-sleeve shirt.

Note: The minimum amount of protective gear now specified on labels consists of: waterproof gloves, long-sleeve shirt, long pants, shoes and socks. Check the label to see if additional PPE is required!

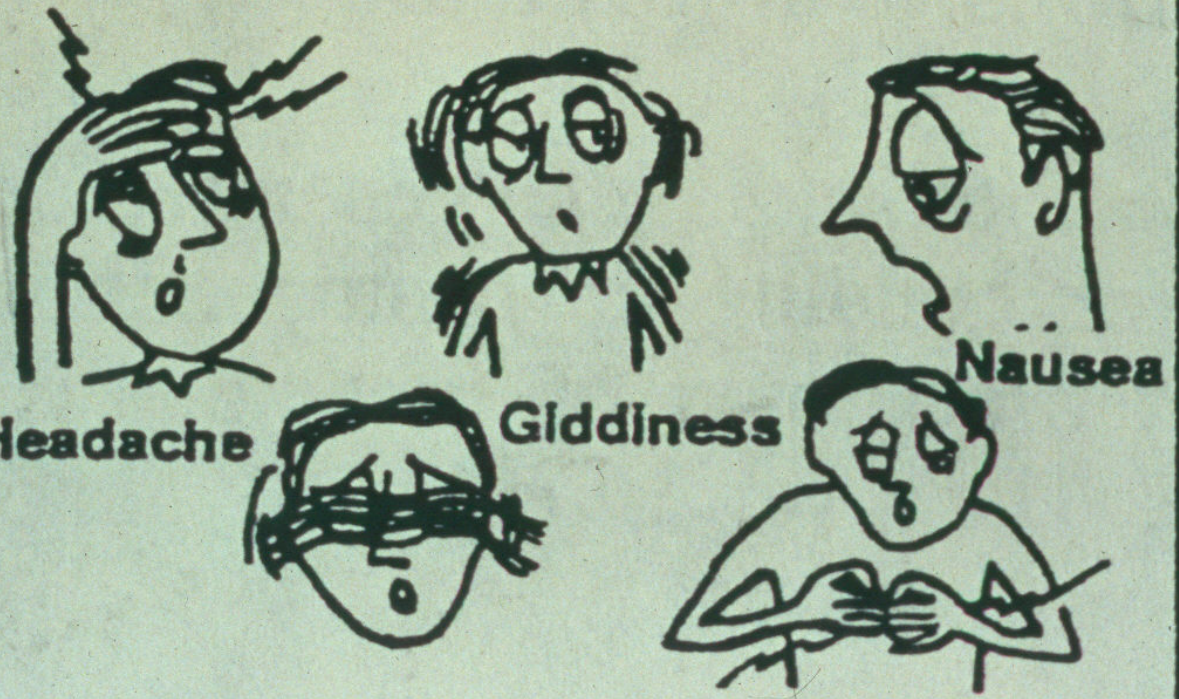
Keep Out of Mouth

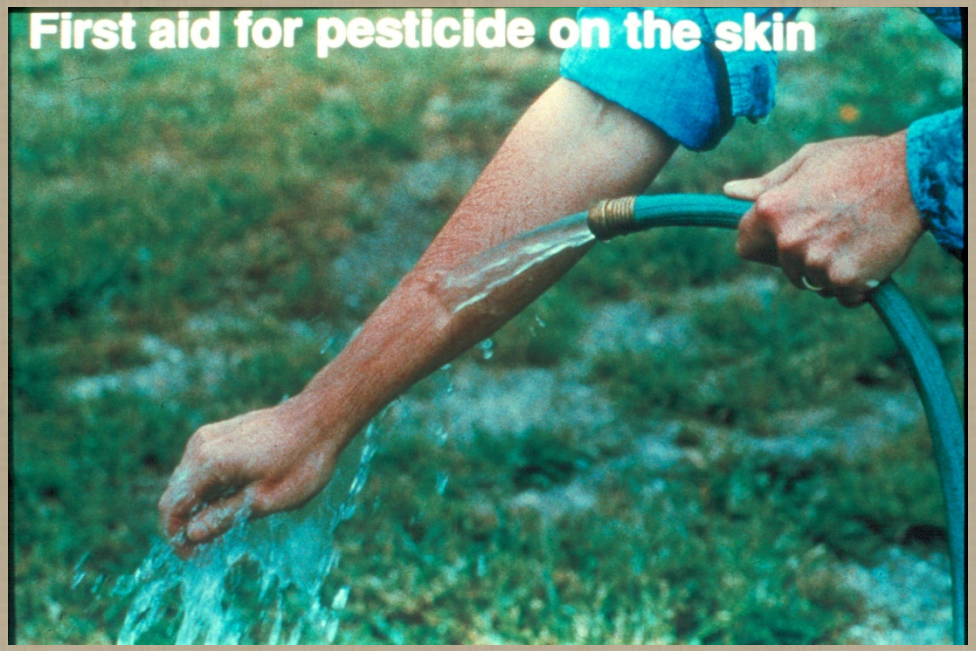
- Never mouth siphon
- Use soft brush to unclog nozzles
- Keep in original container
- No eating, smoking, etc. until you have thoroughly
- cleaned up

Fate of Pesticides in the Body

- Metabolism - broken down or metabolized, usually by the liver.
- Elimination - by urine, sweat, feces, or exhalation.
- Accumulation - stored in body, usually in fat cells.

General Symptoms Associated with Pesticide Poisoning




First aid for pesticide on the skin


First aid for
pesticide in the eyes


First aid for inhaled pesticide

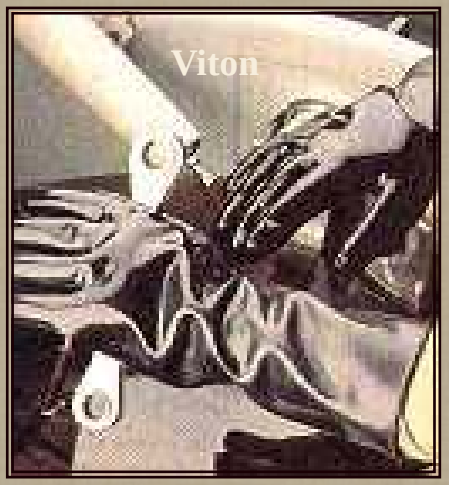
Decontamination Kit

- Clean water*
- Soap or detergent*
- Single use towels (disposable)*
- Emergency phone numbers

*Required by the Worker Protection Standard

PPE: Gloves

- If the label says “waterproof”, you may choose gloves made of rubber or synthetic materials.
- If the label says “chemical resistant”, use the selection chart or use barrier laminate, butyl, nitrile, neoprene, or Viton ($$$).



Personal Protective Equipment (PPE): Gloves

Waterproof or chemical resistant gloves (read the label to determine the correct type) Never wear leather!

PPE: Boots

Choose knee-high rubber or synthetic boots without holes. Wear cuff on outside of boot. Never wear leather.

PPE: Respirators

- Chemical cartridge - Most common. NIOSH or MSHA approved. Organic vapor cartridges TC-23C or TC-14G.

Worker Protection Standards

Worker Protection Standards: EPA added to regulations in 1992.

1. Not clearly defined in FIFRA. Claimed FIFRA supports protection of workers and got it through this way.

2. Purpose is to protect workers: handlers of pesticides and laborers

3. Provisions:

- a. central location
- b. pesticide training
- c. decontamination site
- d. employer information exchange
- e. emergency assistance
- f. monitor: skull and crossbones materials, every 2 hrs
- g. specific instructions for handler
- h. PPE
- i. REI
- j. posting of signs (show slides)

Measurement of Toxicity to Humans

1. Background: EPA uses pure toxicant, regulated by EPA.

- test animals: white mice, white rats, white rabbits, guinea pigs and beagle dogs
- acute oral toxicity are done on rats, put chemical directly into stomach with a tube
- chronic studies: fed in diet over a period of time
- inhalation: done on all animals

2. LD50: lethal dose to 50% of a test population.

white rat is standard. mg/kg = ppm.

EPA requires: 1) oral LD50

2) dermal LD50: done on rats and rabbits

3) LC50 - lethal concentration, respiratory hazard

Measurement of Toxicity to Humans

3. Acute Toxicities: How LD50's relates to human toxicity, result of a one-time exposure of relatively short duration.

A. LD50: lethal dose to 50% of a test population, white rat is standard.

- mg/kg = ppm
- EPA requires:

1) oral LD50

2) dermal LD50: done on rats and rabbits

3) LC50: lethal conc. In water for fish or inhalation toxicity. LC50 is measured in mg/cubic meter or air or per liter of water.

Measurement of Toxicity to Humans

B. To convert LD50 to amount to kill a 154 LB man (70-kg)
multiply it by 70.

- 10 mg/kg * 70 = 700 mg/70 kg person.
- Also, remember that no LD50 is known for people (hard to get volunteers)
- There are however, ALD (average lethal doses) and MLD (mean lethal doses); both calculated from accidental or homicidal deaths.

Measurement of Toxicity to Humans

4. Chronic toxicities:

* Dose-response curve: data from chronic studies are plotted.

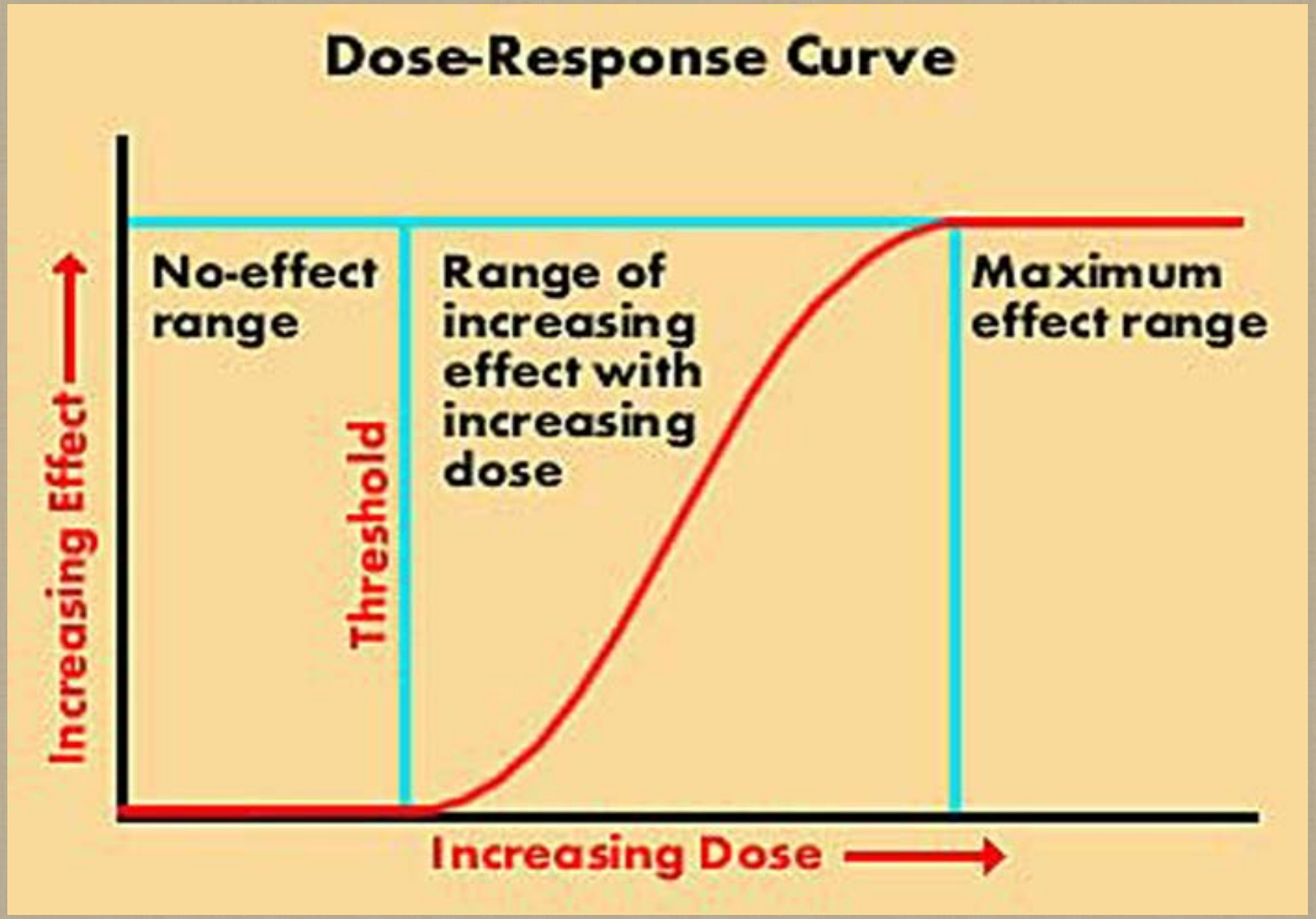
Has 3 parts:

1) flat part: dose that produces no detectable effect

2) Threshold point: increases with increasing dose until the maximum effect.

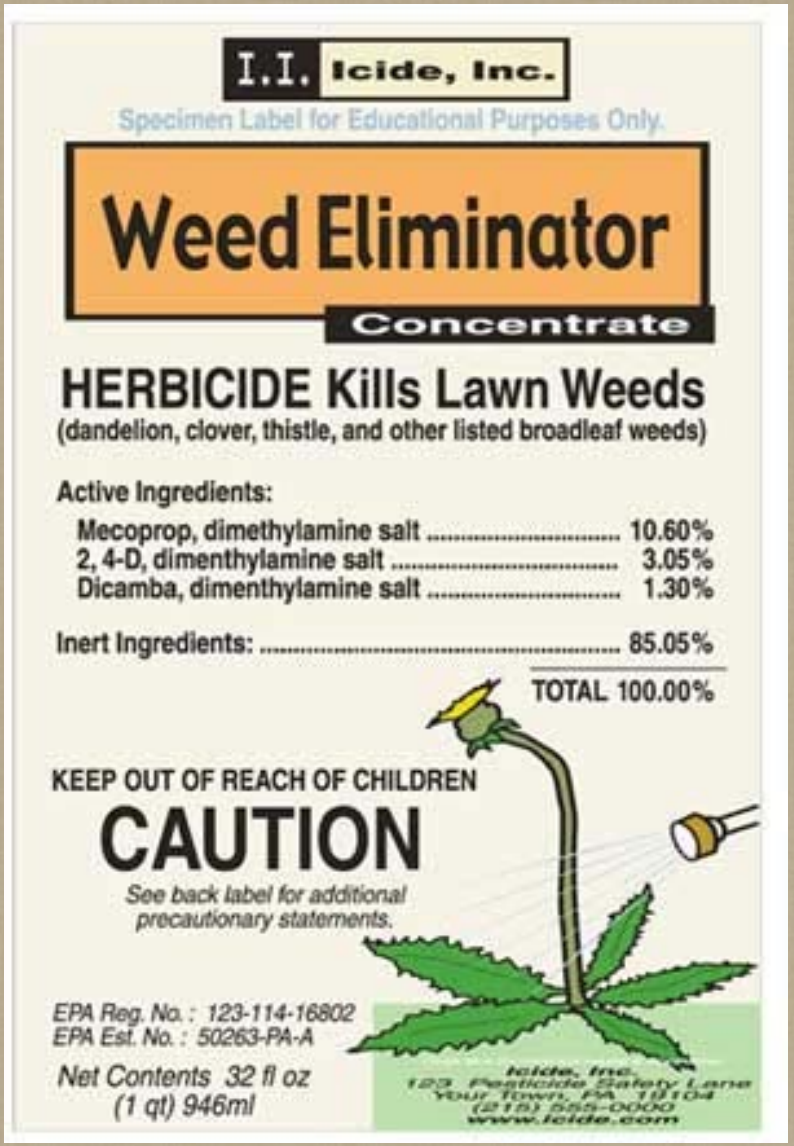
3) Flat part: no effect as you increase dose

Key: in the 2nd part of the curve, from threshold to maximum, the degree of effect increases with increasing dose.


Dose-Response Curve
No-effect range
Threshold
Range of increasing effect with increasing dose
Maximum effect range
Increasing Effect
Increasing Dose

Labels and Labeling

THE LABEL IS THE LAW



I.I. Icide, Inc.

Specimen Label for Educational Purposes Only.

Weed Eliminator

Concentrate

HERBICIDE Kills Lawn Weeds

(dandelion, clover, thistle, and other listed broadleaf weeds)

Active Ingredients:

Mecoprop, dimethylamine salt	10.60%
2, 4-D, dimenthylamine salt	3.05%
Dicamba, dimenthylamine salt	1.30%
Inert Ingredients:	85.05%
TOTAL	100.00%

KEEP OUT OF REACH OF CHILDREN

CAUTION

See back label for additional precautionary statements.

EPA Reg. No.: 123-114-16802
EPA Est. No.: 50263-PA-A

Net Contents 32 fl oz (1 qt) 946ml

Icide, Inc.
123 Pesticide Safety Lane
Your Town, PA 19104
(215) 555-0000
www.icide.com

Parts of the Label

- A brand name is a name used by a manufacturing firm to identify a pesticide as its product
  - Ex. Ortho
- The chemical name is the scientific name for an active ingredient.
  - Ex. 3-(3,4-dichlorophenyl)-1,1-dimethylurea
- The common name is a well-known, made-up name accepted by the EPA to identify an active ingredient.
  - Ex. Diuron

Registration and Establishment Numbers

- A registration number must be on every label.
- It is usually found on the front panel of the label and will be written as “EPA Registration No. 0000-00.”
- This establishment number tells what factory made the chemical. It does not have to be on the label but somewhere on the container.

EPA's Toxicity Classes:

a. EPA Class 1: LD50 oral of 0 to 50 mg/kg; signal word of Danger-Poison, highly toxic.

b. EPA Class 1: 50 to 500 mg/kg; Warning, moderately toxic

c. EPA Class 1: 500 - 5000 mg/kg, Caution, slightly toxic

d. EPA Class 1: > 5,000 mg/kg, Caution.

Signal Words

SIGNAL	TOXICITY RATING	LETHAL DOSE 160 lb. human[2]
Danger[1]	Highly toxic OR Highly corrosive	Few drops to 1 Teaspoon.
Warning	Moderately toxic	1 Teaspoon to 1 Tablespoon.
Caution	Least toxic	1 Tablespoon to a pint or greater.

[1] Sometimes the word 'Danger' appears with the word 'Poison' and the skull and crossbones symbol for extremely toxic pesticides. Danger by itself usually relates to the pesticide's capacity to cause serious skin or eye damage.

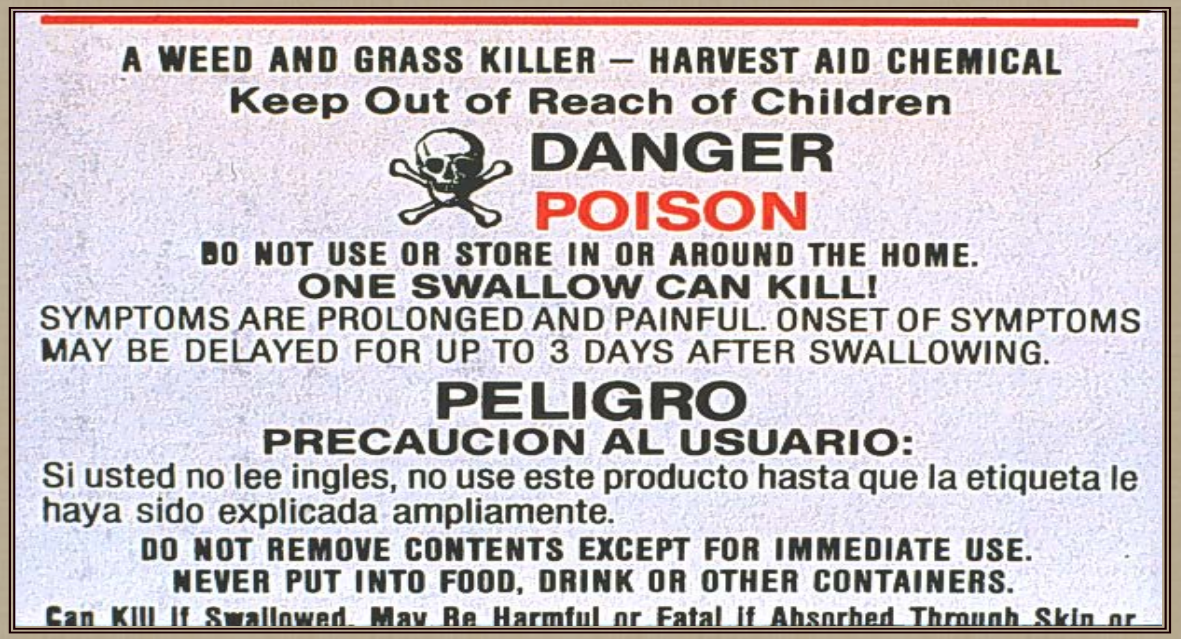
[2] Remember that a 40 lb. child could be poisoned by one-fourth the amount required for an adult. Always store pesticides in their original containers and keep away from children, livestock, pets and anyone not trained in pesticide use.

Signal Words

Required by EPA. Tells you the toxicity of the pesticide.

1) Danger-Poison: skull & crossbones, highly toxic.

- Amount to kill a 150 lb. man - a taste to a teaspoonful.
- LD50 up to 50 mg/kg



Signal Words

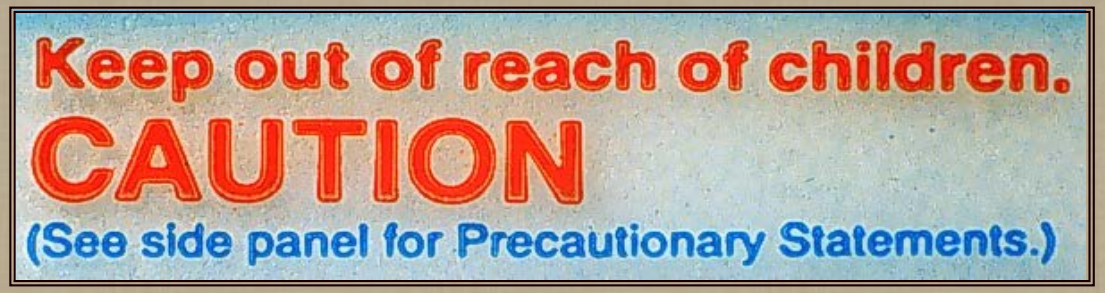
2) Warning: moderately toxic

- Amount to kill a 150 lb. man - teaspoonful to a tablespoonful
- 50 to 500 mg/kg LD50 oral.

Signal Words

3) Caution: slightly toxic

- Amount to kill a 150 lb. man - an ounce or more
- LD50 > 500 mg/kg.



ACTIVE INGREDIENTS:

(E)-11-Tetradecen-l-yl Acetate	16.90%
(E,E)-9,11-Tetradecadien-l-yl Acetate	0.71%
OTHER INGREDIENTS:	82.39%
TOTAL	100.00%

Keep Out Of Reach Of Children

CAUTION

PRECAUTIONARY STATEMENTS

HAZARDS TO HANDLERS AND APPLICATORS EXPOSED TO THE CONCENTRATED PRODUCT

CAUTION: Potentially harmful if swallowed, absorbed through skin, or inhaled. Causes moderate eye and skin irritation. Avoid contact with skin, eyes and clothing. Applicators should avoid breathing vapor or spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco. Remove contaminated clothing and wash before reuse.

Label Information

Trade Name

Active Ingredients

Inert Ingredients

Other Statements found on the label

- Precautionary Statements
  - Hazards to Humans – will tell you the ways in which the product may be poisonous to humans and animals.
  - Environmental Hazards
    - “This product is highly toxic to bees exposed to direct treatment or to residues on crops.
    - “Do not contaminate water when cleaning equipment or when disposing of wastes.”
  - Physical and Chemical Hazards – tells of any special fire, explosion or chemical hazard.

- Statement of Practical Treatment (First-Aid)
  - Gives you emergency first aid measures.
  - Tells what types of exposure require medical attention.

Other statements …

- Statement of Use Classification
  - To sell a pesticide, a manufacturer must submit information to EPA about its toxicity, hazards, and effectiveness
- EPA considers three factors in deciding whether to classify a pesticide as general or restricted use:
  - The hazard of the poison
  - The way the pesticide is used
  - Its effects on the environment

Classification

- General Use
  - A general use pesticide is one which will not generally cause unreasonable adverse effects on the environment when used in commonly recognized practices in accordance with its labeling.
- Restricted Use
  - A restricted use pesticide is one which could cause some human injury or environmental damage even when used as directed on the label.

Misuse Statement

- Will remind you that it is a violation of Federal Law to use a product in a manner inconsistent with its labeling.

TERMS OF MEASUREMENT

- ppm: can be thought of as 1 inch in 16 miles, 1 drop in 50 gallons, or 1 second in 12 days.
- ppb: 1 inch in 16,000 miles, 1 drop in 50,000 gallons of water, 1 second in 21 years, 1 penny in $10,000,000, units are 1 microgram/kg= 1ppb
- ppt: 1 inch in 16,000,000 miles, 1 drop in 50,000,000 gallons, 1 second in 32,000 years. 1 mg/kg = 1 ppt

Pesticide Nomenclature

1) Common name: carbaryl

2) Tradename: Sevin

3) Chemical name: 1-naphthyl N-methylcarbamate

**Important to learn “common names.”

- Some pesticides have same “common” and “tradename”

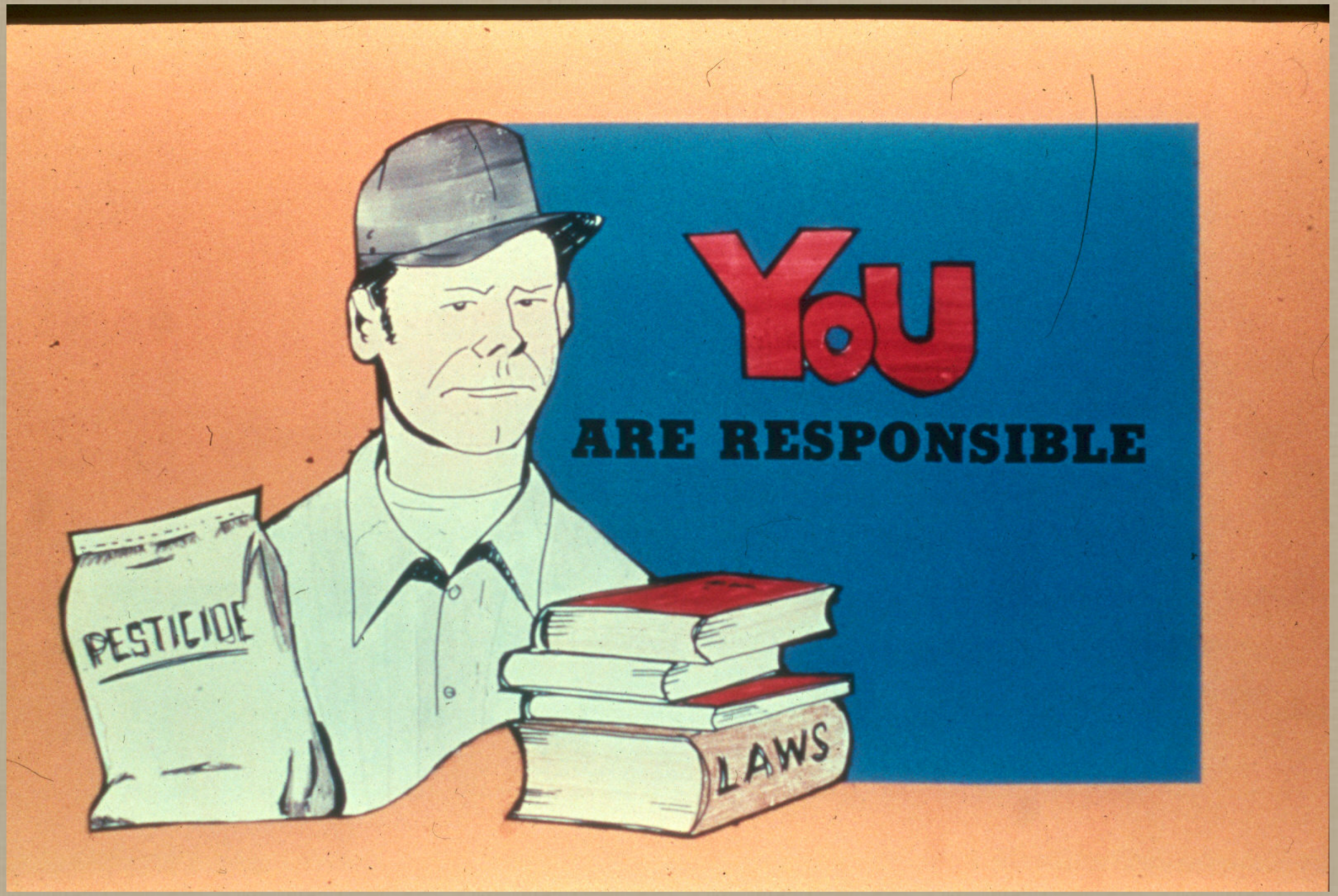
  ex. malathion, diazinon

Pesticide Nomenclature

1) Common name: glyphosate

2) Tradename: Roundup

3) Chemical name: N-phosphonomethyl-glycine


YOU
ARE RESPONSIBLE
PESTICIDE
LAWS