



ACE Preparation Course

PESTICIDE SAFETY, LAWS & LABELS

Overview

Science of Toxicology

Pesticide Safety

Pesticide Labels

Personal Protective Equipment

Pesticide Spills

Pesticide Laws & Regulations

Pesticide Routes of Entry

Stomach Poisons

- **Must be swallowed by pest**
- **Baits, some dusts & liquids**
- **Ingestion through direct feeding, grooming, communication, coprophagy (eating feces), necrophagy (cannibalism of dead)**

Contact Pesticides

- **Penetrate outer body wall or feet of pest**
- **Residual contact**
- **Direct contact**



Pesticide Routes of Entry

Fumigants

- **Enter through respiratory system**
- Methyl Bromide
- Sulfuryl fluoride
- Phosphine
- Paradichlorobenzene

Desiccants

- **With insects, desiccants damage the outer waxy layer of the cuticle.**
- Diatomaceous earth
- Silica aerogel





Pesticide toxicity

Acute toxicity

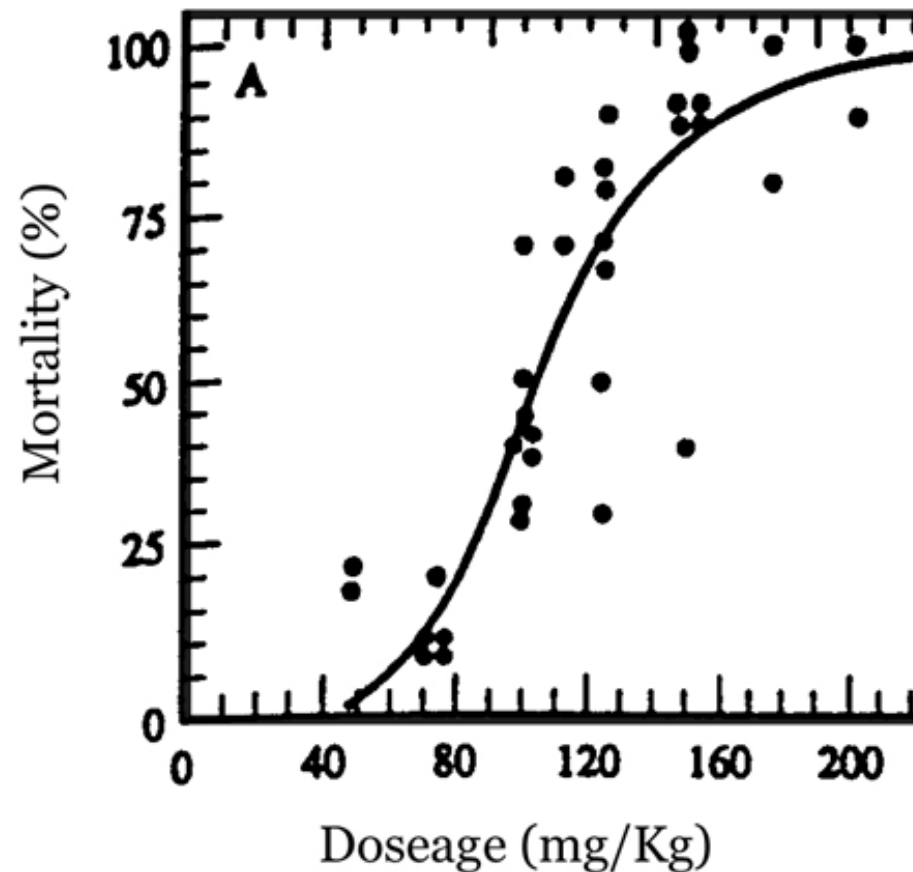
Rapidly produced toxicity, usually resulting from a single exposure

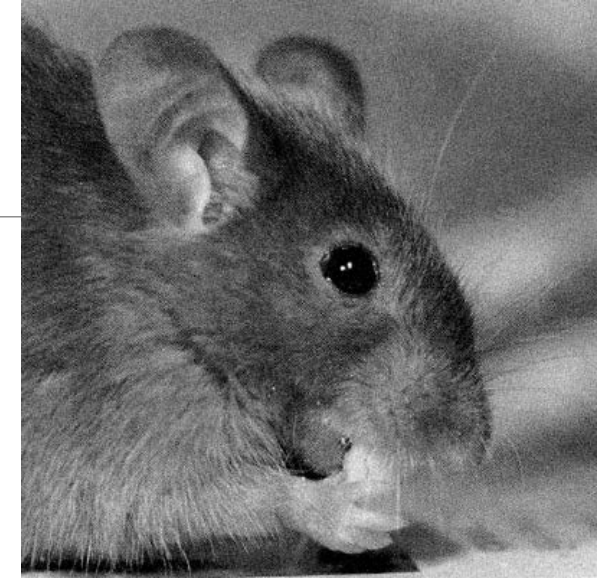
Chronic toxicity

Toxicity due to slow-action or long-term exposure to a poison

Measuring Acute Toxicity

One important measure of acute pesticide toxicity is based on the dose-response curve



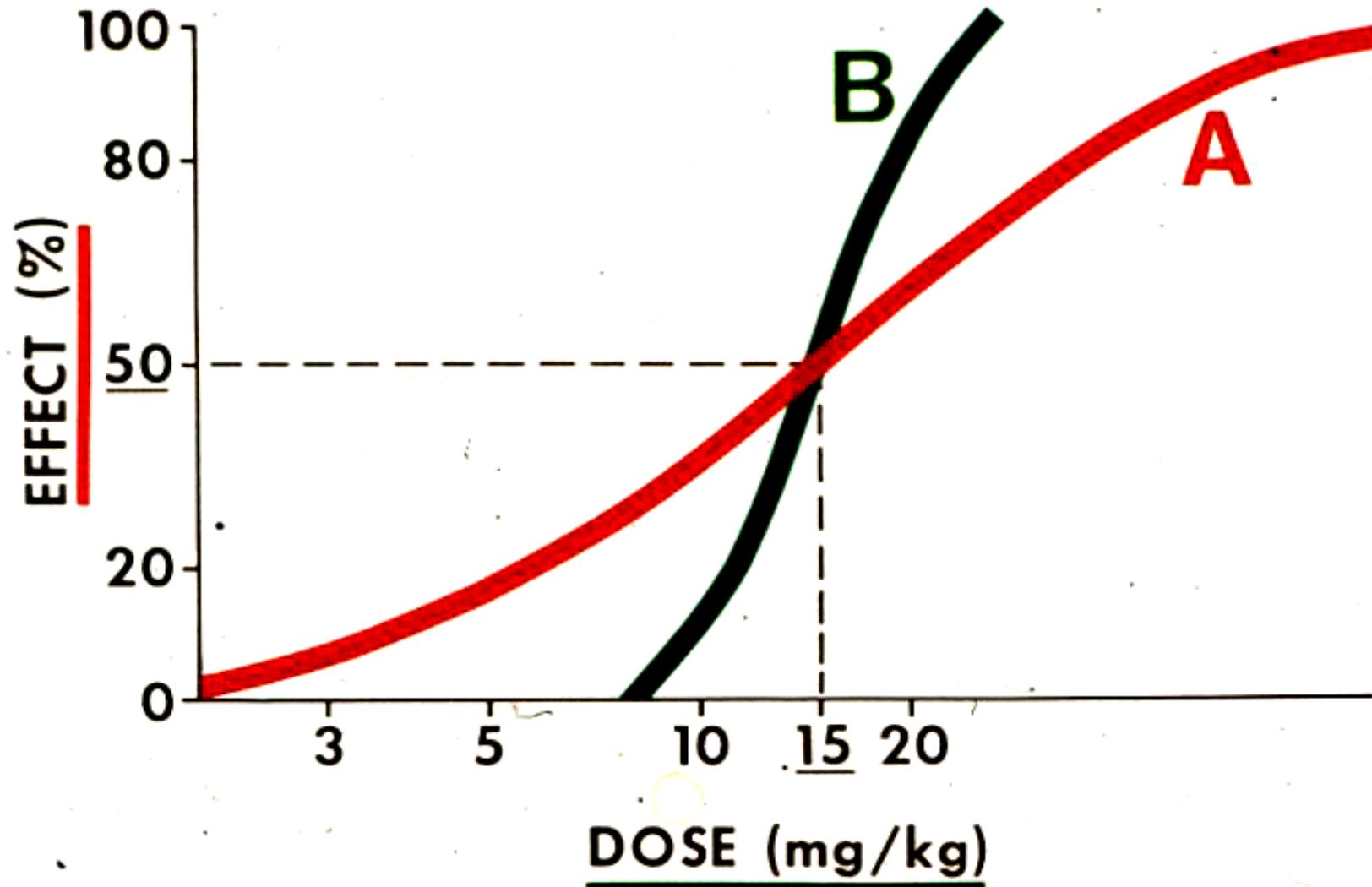


Some terms

LD₅₀ (Lethal Dose 50) - The amount of material needed to kill half of a test population

Mg/Kg – The amount of toxin (in milligrams) per Kilogram of body weight of the test subject (equals parts per million)

Note that two pesticides may have the same LD50, but behave very differently



EPA Pesticide Toxicity Classes

	Extremely Toxic	Very Toxic	Moderately Toxic	Slightly Toxic
Toxicity Category	I	II	III	IV
Signal Word	Danger	Warning	Caution	Caution
Oral LD ₅₀ (mg/Kg)	0 – 50	50 – 500	500 – 5,000	> 5,000
Equivalent Lethal Dose for 150 lb human	Less than a teaspoon	Teaspoon to an ounce	Ounce to a Pint	Pint to a quart or more

Possible chronic effects



Carcinogenicity-cancer

Mutagenicity-genetic mutations

Teratogenicity-birth defects

Oncogenicity-tumors

Reproductive effects

Delayed neurological effects

Tests required to register a pesticide

Acute oral toxicity

Acute dermal toxicity

Acute inhalation

Acute intra-peritoneal

Eye irritation

Dermal irritation

Dermal photosensitization

Acute delayed neurotoxicity

90-day rat feeding study

12-month dog feeding study

21 & 90-day dermal

Lifetime rat feeding study

Lifetime mouse feeding study

Teratology (rat)

Teratology (rabbit)

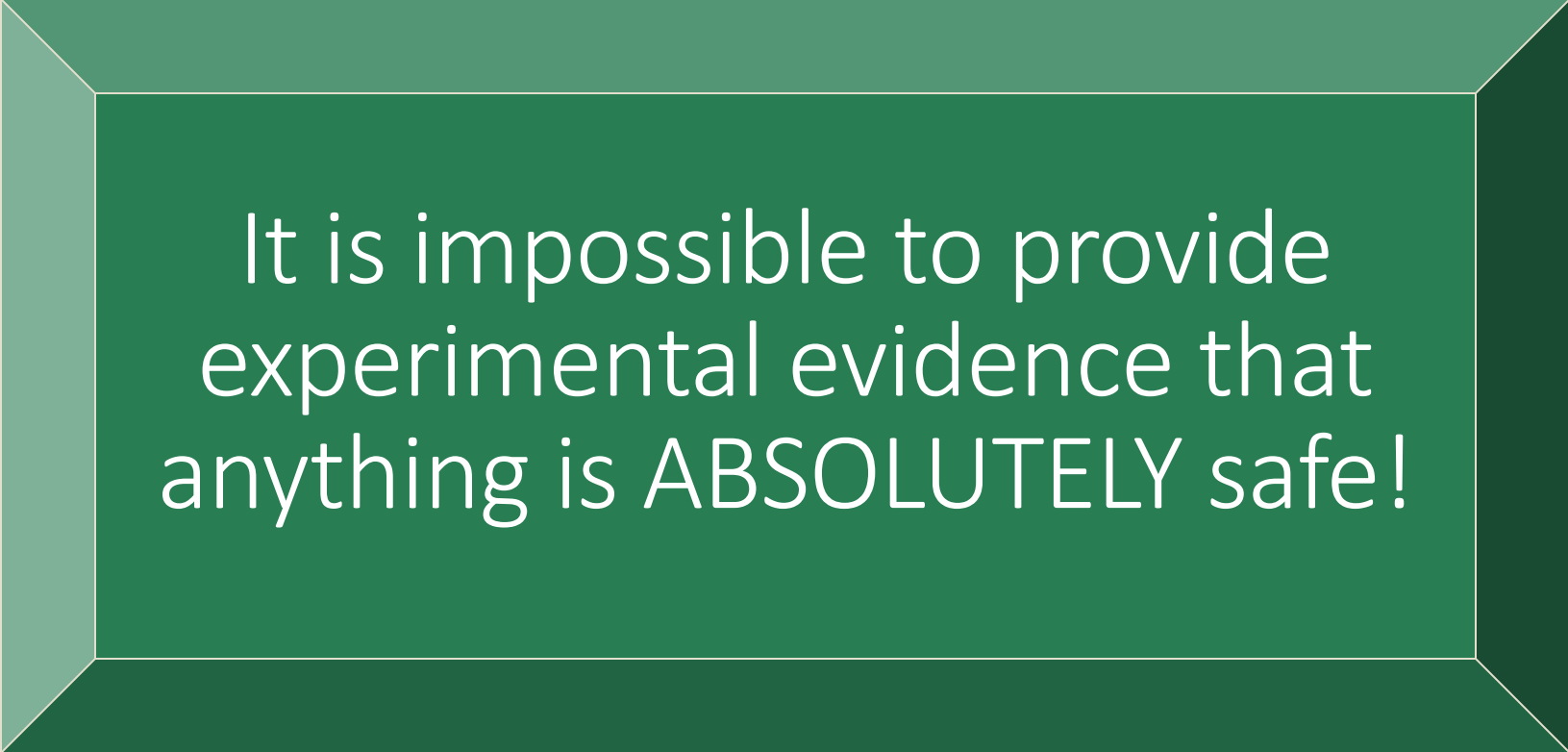
Reproduction

Excretion/metabolism &
accumulation

Antidote

Mutagenicity





It is impossible to provide
experimental evidence that
anything is **ABSOLUTELY** safe!



Toxicity x Exposure =
Hazard

What can you do to reduce your hazard or risk?

Wear protective gear

Select less hazardous formulations

Follow label directions and precautions





Pesticide Labels & Labeling

The label is the law

The label tells you about

- **Safety to the environment, property, pets, plants**
- **Applicator safety and safety equipment**
- **Safe handling and mixing practices**
- **Proper clean-up and disposal**

Labels and labeling

Label is all printed material attached to or part of pesticide container

Labeling is additional printed information to supplement the label, but not necessarily attached to container.



Alpine® WSG

Water Soluble Granule Insecticide

ACTIVE INGREDIENT:

Dinotefuran: N-methyl-N-[(tetrahydro-3-furanyl)methyl]guanidine 40.0%

OTHER INGREDIENTS:..... 60.0%

TOTAL: 100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

EPA Reg. No. 499-561 • EPA Est. No. 065387-AR-002

**IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT
IN A MANNER INCONSISTENT WITH ITS LABELING.**

See full label on resealable outer bag for listed pests, use sites, First Aid,
Precautionary Statements, Directions for Use and Storage and Disposal.

Net Weight: 0.35 oz (10 g)

Manufactured for:

Whitmire Micro-Gen Research Laboratories, Inc.®

3568 Tree Court Industrial Blvd.

St. Louis, MO 63122-6682

Questions? Call 1-800-777-8570

© 2012 Whitmire Micro-Gen Research Laboratories, Inc.®

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Understanding the Pesticide Label

Brand Name

Formulation Type

Active Ingredient(s)

Front panel precautions

- Signal Word
- Child hazard warning
- Keep out of reach of children
- Statement of practical treatment

EPA registration number

EPA Establishment number

Net contents

Understanding the Pesticide Label

Personal Protective Equipment (PPE)

- Special notes for pesticide handlers (mixers, loaders, applicators)
- Safety is especially important for professionals



Supersedes: April, 2001

MATERIAL SAFETY DATA SHEET

ZOECON® CATALYST™ EMULSIFIED IN WATER INSECTICIDE

Manufacturer: Wellmark International

Address: 1100 East Woodfield Road, Suite 500 Schaumburg, IL 60173

Emergency Phone: 1-800-248-7763

Transportation Emergency Phone: CHEMTREC: 1-800-424-9300

1. CHEMICAL PRODUCT INFORMATION

Product Name: Zoecon® Catalyst™ Emulsified in Water Insecticide

Chemical Name/Synonym: Propetamphos: {(E)-1-methylethyl 3-[[{(ethylamino) methoxyphosphinothioyl}oxy]-2-butenate

Chemical Family: Organophosphate

Formula: C10 H20 N O4 PS

EPA Registration No.: 2724-450

RF Number: 9001

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Component (chemical, common name)</u>	<u>CAS Number</u>	<u>Weight</u>	<u>Tolerance</u>
Propetamphos: {(E)-1-methylethyl 3- {(ethylamino)methoxyphosphinothioyl}oxy}-2-butenate}	31218-83-4	18.9%	Not established
Inert Ingredients (non-hazardous and/or trade secret):		81.1%	Not established

3. HAZARD INFORMATION

PRECAUTIONARY STATEMENT

WARNING: Keep out of the reach of children. May be fatal if swallowed. Harmful if inhaled or absorbed through the skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes, or clothing.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

This product contains a cholinesterase inhibiting compound. Early symptoms are unspecific and may include headache

Safety Data Sheets

OSHA Form 20

Information source for employees and employers on hazardous materials

Includes LD50 values, fire, reactivity hazards

Handling Pesticide Spills

If situation beyond your control, call
local regulatory agencies

Know the label

Have a “Kit”

The “Three C’s”

- Control
- Containment
- Clean-up



Clean up the spill

Pick up Spilled Pesticide

- collect absorbent material: bag, bucket, trench

Decontaminate Site

- Check label/SDS & call manufacturer
- Bleach, hydrated lime or activated charcoal

Decontaminate Equipment

- bleach, dishwasher detergent & water
- dispose of porous materials





Federal Acronyms to know

EPA

- Environmental Protection Agency:
- Est: 1970 (by Congress)

FIFRA

- Federal Insecticide, Fungicide and Rodenticide Act: 1947 (Principal law governing pesticide labeling and use)
- gives EPA power to register pesticides before they can enter the U.S. market

FEPCA:

- Federal Environmental Pesticide Control Act
- Amendment to FIFRA: 1972

Federal Pesticide Laws & Regulations

FIFRA Requires EPA to:

- register all pesticides, each use and approve product labels....
- classify pesticides as “general use” or “restricted use”....
- RUP’s must be applied by certified applicators or by individuals under direct supervision of above....

RESTRICTED USE PESTICIDE
DUE TO AQUATIC TOXICITY AND ACUTE INHALATION TOXICITY
For retail sale to, and use only by, Certified Applicators or persons under their direct supervision and only for those covered by the Certified Applicator's certification.

KEEP THIS BOOKLET WITH THE CONTAINER AT ALL TIMES

PRENTOX
SINCE 1919

PRENFISH TOXICANT

Liquid-Emulsifiable
For Control of Fish in Lakes, Ponds, Reservoirs and Streams



ACTIVE INGREDIENTS:

Rotenone	5.0%
Other Associated Resins	10.0%
INERT INGREDIENTS*	85.0%
TOTAL	100.0%

*This product contains aromatic hydrocarbons

EPA Reg. No. 655-422

Prentox® - Registered Trademark of Prentiss Incorporated
EPA Est. No. 655-GA-7

 **KEEP OUT OF REACH OF CHILDREN** 
DANGER - POISONOUS
See Additional Precautionary Statements Below

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
DANGER

Fatal if inhaled. May be fatal if swallowed. Harmful if absorbed through skin. Causes substantial but temporary eye injury. Causes skin irritation. Do not breathe spray mist. Do not get in eyes, on skin or on clothing. Wear goggles or safety glasses. Wear either a respirator with an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix 14C) or a canister approved for pesticides (MSHA/NIOSH approval number prefix 14C).



Federal Pesticide Laws & Regulations

FIFRA Requires EPA to:

- make rules for storage and disposal of pesticides
- set civil and criminal penalties...
- permits states to set more restrictive but not more permissive standards.



What is a Regulation?

Regulations

- Codified interpretations of the law by the agency charged with enforcement
- Carry the force of law!

EPA has regulations that pertain to:

- Pesticide registration
- Emergency uses
- Worker protection standards
- Restricted entry intervals for treated areas
- Pesticide residue tolerances
- IPM



EPA Mandates:

Pesticide Registrations

- Consider economic, social and environmental costs & benefits in registration
- Use data and studies from manufacturer, required data include:
 - Human health, plants, fish, wildlife and endangered species
 - Human risks
 - Acute & Chronic effects, carcinogenicity, birth defects, reproductive system disorders, DNA effects, etc.
 - Environmental Fate Data



EPA Mandates:

Worker Protection Standards

- EPA also sets regulations for “pesticide handlers” (mixer, loader, applicator). See labels.

Restricted Entry Intervals (REI’s)

- Time during and directly after a pesticide application that an unprotected worker may not enter a treated area.



EPA Mandates: Food Quality Protection Act

Pesticide Tolerances:

- FQPA (1996): EPA must set tolerances for pesticides in foods and feed.

IPM (Integrated Pest Management)

- FQPA (1996): Research and education in IPM mandated.
- Cooperation between EPA & USDA
 - Improve pesticide use & limit environmental hazards.



Other Federal Acts (Laws)

FDCA: Food Drug & Cosmetic Act (1938)

- EPA sets food & feed tolerances, Food and Drug Administration enforces

FQPA (1996) Food Quality Protection Act

- Created “Risk Cup” concept. When granting registrations, EPA must consider total human exposure likelihood for each active ingredient (i.e., via drinking water, food residues, home, golf courses, pets, workplace, etc.) and remove uses when aggregate exposure considered too high.



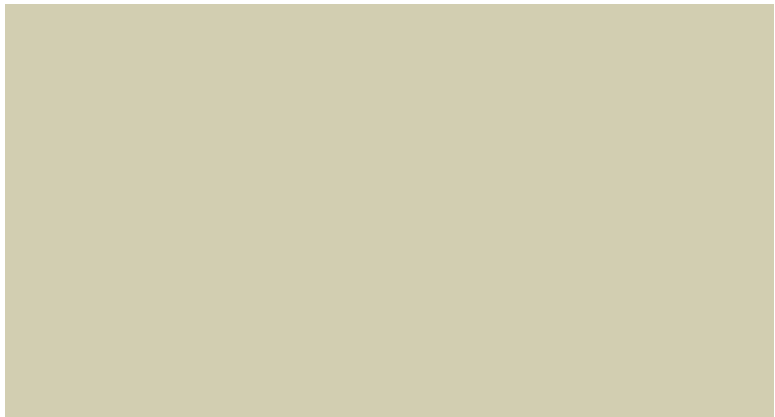
Other Federal Acts (Laws) & Rules

OSHA: Occupational Safety & Health ACT (1970)

- Occupational Safety and Health Administration
- Employers with 11 or more employees to keep and report records of work-related injuries, deaths.

HCS: Hazard Communication Standard (rule enforced by OSHA)

- List all hazardous substances in workplace
- Have SDS's available
- Label all containers
- Have a written communication program



Other Federal Acts (Laws) & Rules

RCRA: Resource Conservation & Recovery Act (1976)

- Directs EPA to manage wastes (disposal, etc).
- **TSA : Transportation Safety Act (1974).**
 - US DOT regulate transportation of hazardous substances
 - Shipping papers, placarding, signing, etc.
 - Pesticides have a Reportable Quantity (RQ). If exceeded, shipping papers required.

Other Federal Acts (Laws) & Rules



National Geographic

SARA Title III

- Superfund Amendments & Reauthorization Act
- Federal Right to Know Law
 - Emergency Planning & Notification
 - Emergency Release Reporting
 - MSDS Reporting
 - Annual Chemical Inventory Reporting
- Local Emergency Planning Committee (LEPC)
- State Emergency Response Commission (SERC)

ESA

- Endangered Species Act (1973).
- US FWS determines if species is endangered.
- Labels list restricted counties where uses restricted

What the best definition of pest?

Injuries humans, animals, crops, structures, or possessions

Competes with humans, domestic animals, or crops for food or water.

Spreads disease to humans, domestic animals, or crops

All of the above

What Does the Term LD50 stand for

Lethal dose required to kill
50 test animals

Lethal dose required to kill
 $\frac{1}{2}$ of the tested population

Lowest dose required to kill
 $\frac{1}{2}$ of the tested population

Lowest dose needed to kill
an EPA 'Strain 50' test rat

If substance "A" has an LD50 of 250 and substance "B" has an LD50 of 2500, B is the most toxic

TRUE

FALSE

Quiz

What the best definition of pest?

- a. Neighbor's kids
- b. Insects
- c. A living thing out of place or time
- d. Weeds

c) A living thing out of place or time

Quiz

What Does the Term LD50 stand for

- a. Lethal dose required to kill 50 test animals
 - b. Lethal dose required to kill ½ of the tested population
 - c. Lowest dose required to kill ½ of the tested population
 - d. Lowest dose needed to kill an EPA 'Strain 50' test rat
-
- b. Lethal dose required to kill ½ of the tested population

Quiz

If substance “A” has an LD50 of 250 and substance “B” has an LD50 of 2500, B is the most toxic

- a. TRUE
- b. FALSE

b) FALSE A lower LD50 number indicates a substance requires less to kill, hence more toxic

UNLESS OTHERWISE INDICATED,
PHOTOS BY MIKE MERCHANT

Questions