

2009

## Pesticide Safety 2009 - Pesticide Safety Review and PPE

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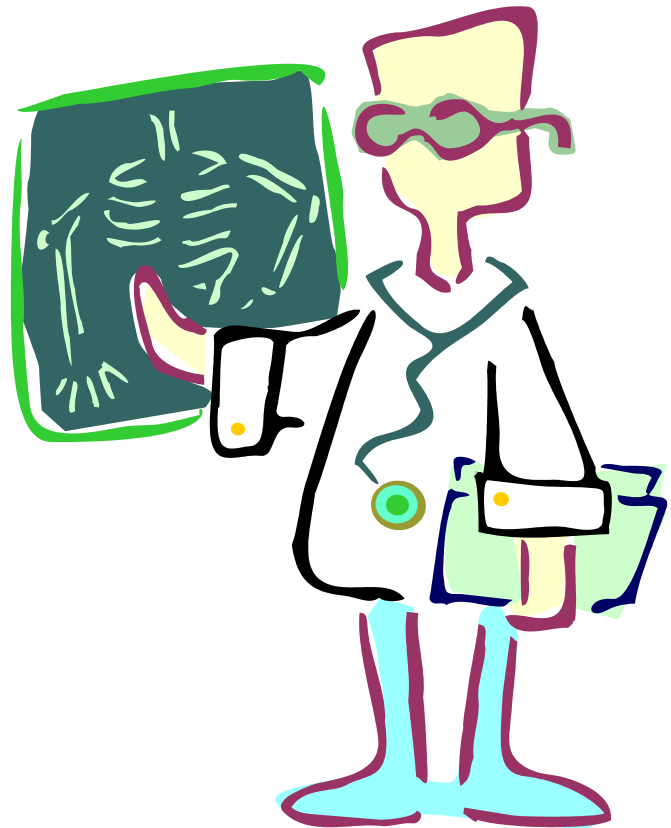
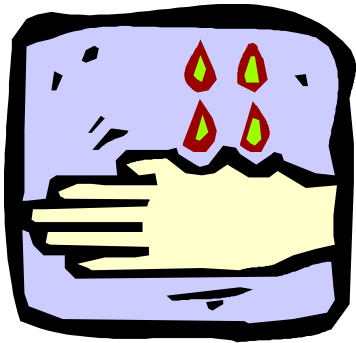
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# ***Pesticide Safety Training 2009***

## **Pesticide Safety Review and PPE**

**Martha Sylvia  
Entomology Lab  
Cranberry Station  
UMass Amherst**





# How to Keep Safe

- Reduce Your Risk

- Minimize Exposure

- Know Your Products

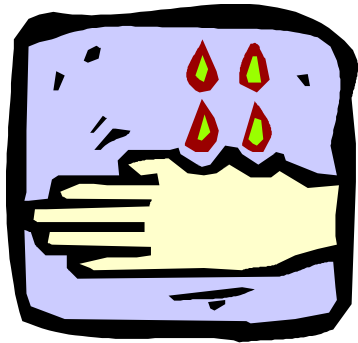
- Personal Protective Equipment

# Reduce Your Risk

- Read the label
- Wear at least the PPE that is recommended
  - Protect what the label tells you to protect (eyes, lungs...)
- Use common sense
- Don't be lazy!

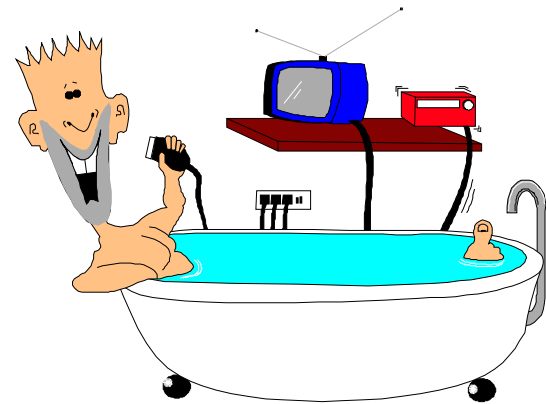


# HAZARD = EXPOSURE x TOXICITY



**Exposure** - how pesticides enter the body

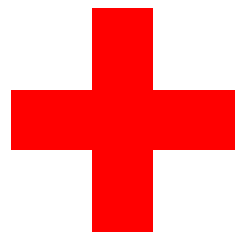
**Toxicity** - how poisonous the pesticide is



# 4 Methods of Exposure

- Dermal (skin)
- Oral (mouth)
- Inhalation (lungs)
- Eyes





## Dermal exposure

The most common way for pesticides to enter the body is through the skin!

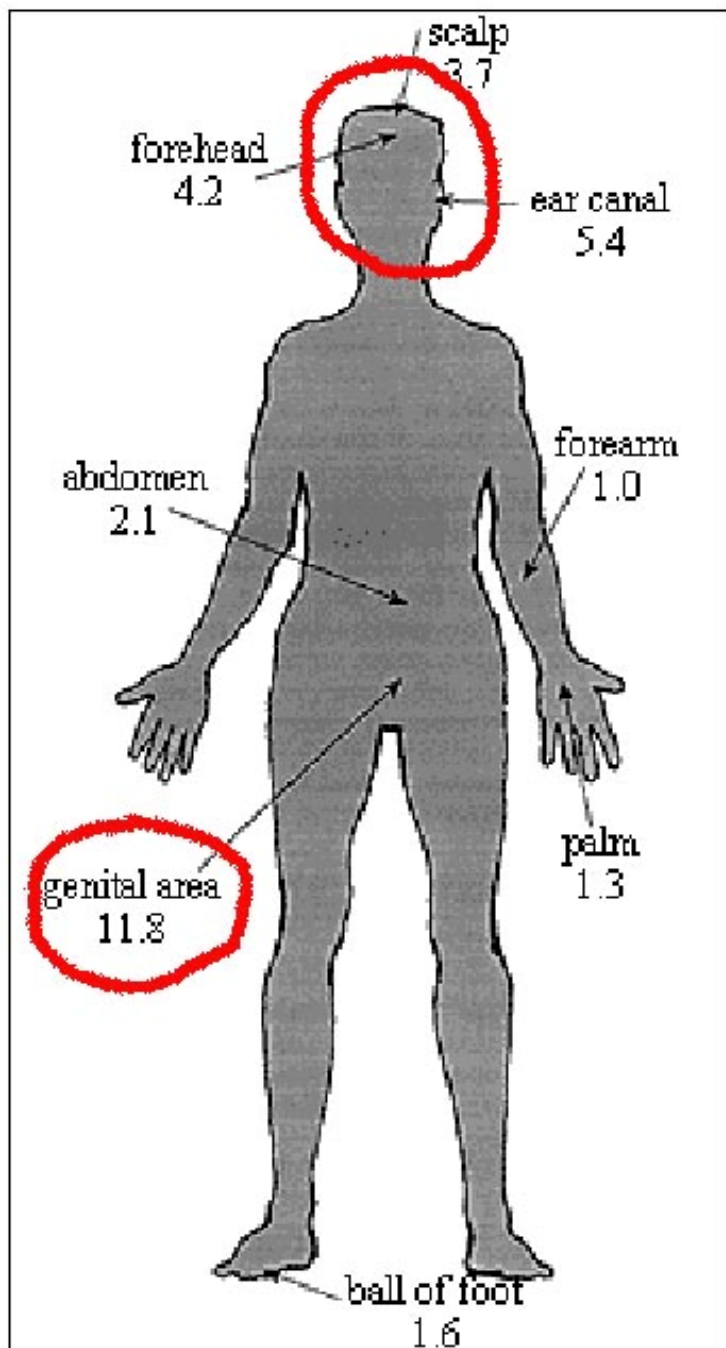
If exposed...

- ❑ rinse with water (15 minutes!%#!)
- ❑ remove contaminated clothing
- ❑ wash with plenty of soap and water

Wear your PPE

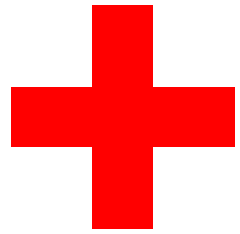
Wash your hands





- Parts of the body absorb pesticides at different rates.
- The head is 4 times more absorbent than the hand.
- The genital area is 11 times more absorbent.





# Oral Exposure

- rinse mouth with water

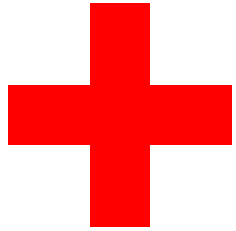


- Do not induce vomiting if

- victim is unconscious
- having convulsions
- petroleum based product
- corrosive pesticide
- label specifies NOT to induce vomiting

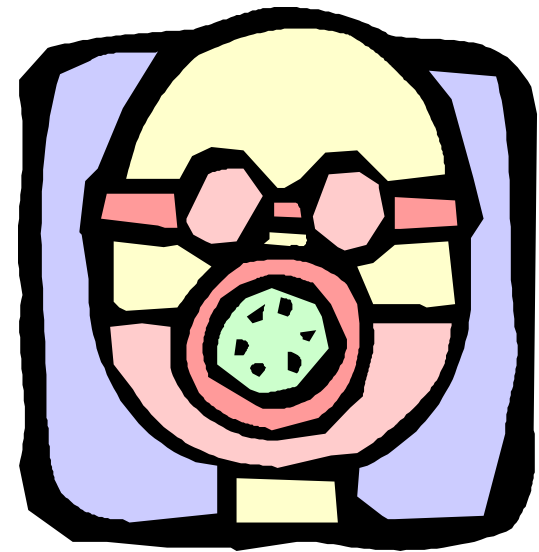
Pesticides removed from their original containers are the highest cause of pesticide poisonings in adults and children.

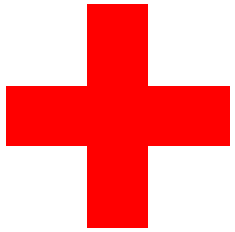




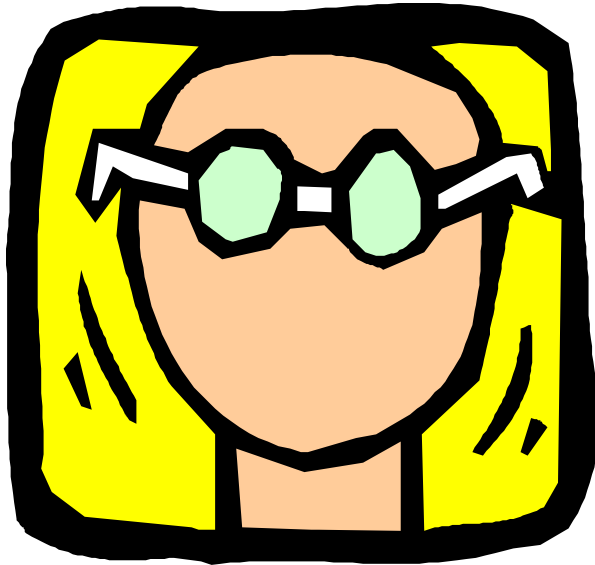
# Inhalation Exposure

- ❑ remove to fresh air
- ❑ loosen tight clothing
- ❑ keep air passages clear
- ❑ perform artificial respiration if necessary





## Eye exposure



- wash eye with a gentle stream of clean water for 15+ minutes
- get medical attention if there is pain or reddening of the eye



# Know Your Products

- **Insecticides**

- **worry**

- **Fungicides**

- **Some worry**

- **Herbicides**

- **Generally no worry**

# Know Your Products

## INSECTICIDES

- **Diazinon**

- **Lorsban**

- **Orthene**

- **Imidan**

- **Sevin**

- BT products

- Confirm

- **Intrepid**

- Nematodes

- Pyrenone

- Nexter  
(Pyramite)

- **Actara**

- **Admire**

- **Avaunt**

- **Spintor**

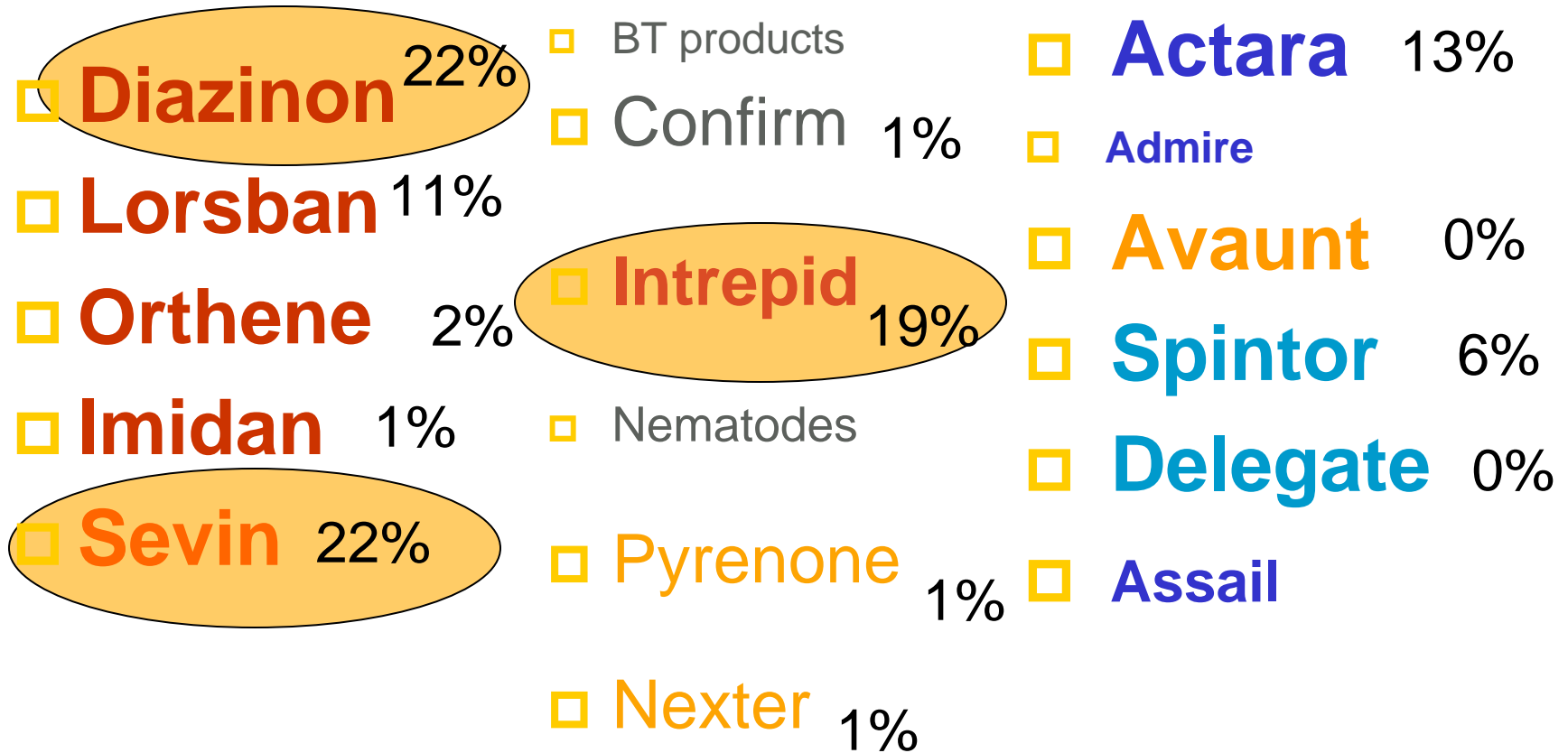
- **Delegate**

- **Assail**

# Know Your Products

## INSECTICIDES

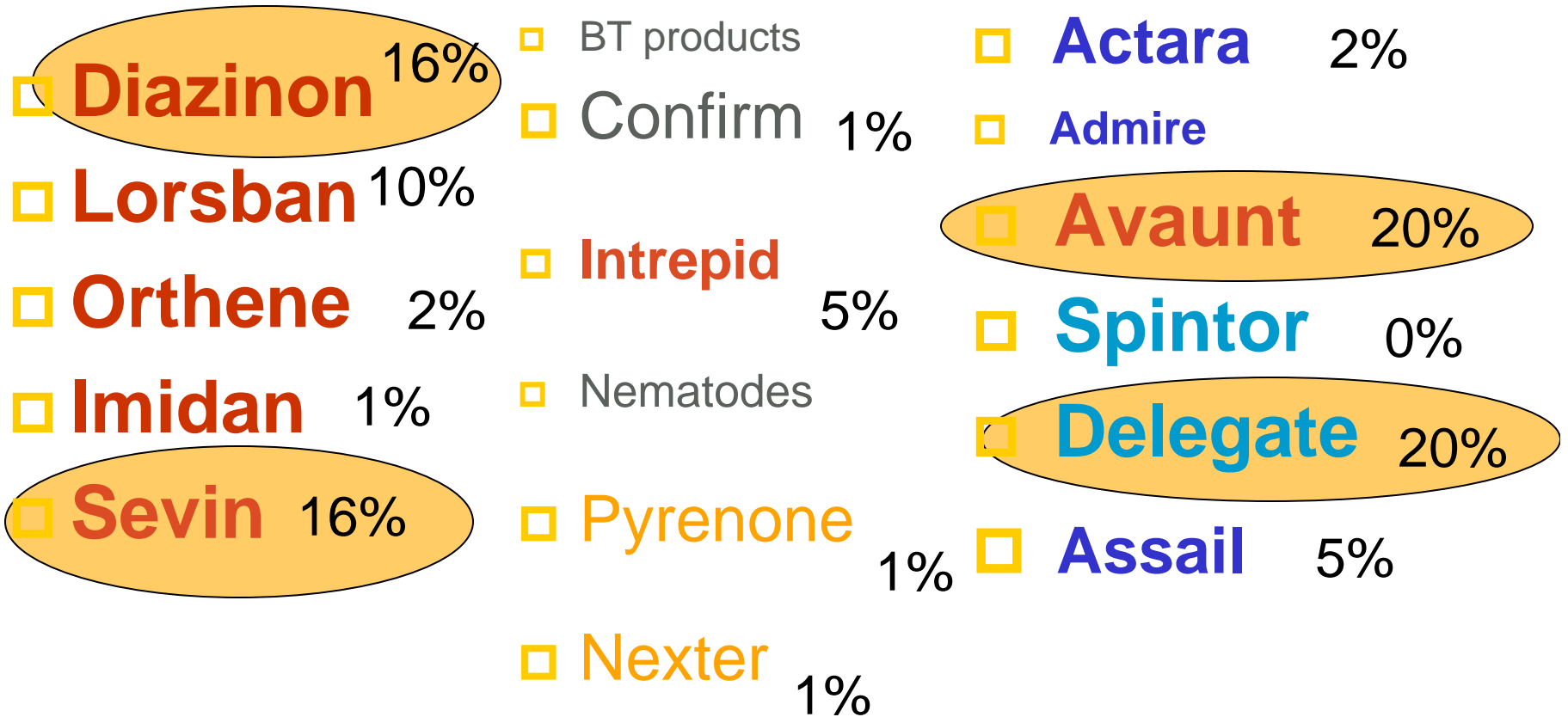
### 2007 OS Usage



# Know Your Products

## INSECTICIDES

**2009  
expected  
Usage**





# Know Your Products

## FUNGICIDES

### Chlorothalonils

□ Bravo

□ Echo

EDBCs

□ Mancozeb

□ Maneb

□ Dithane

□ Penncozeb

□ Manzate

### Coppers

□ Champ

□ Kocide

□ Top Cop

□ Nu-cop

□ Ferbam

□ Indar

□ Aliette

□ Ridomil

# Know Your Products

## FUNGICIDES

### Chlorothalonils

□ Bravo

□ Echo

54%

EDBCs 23%

□ Mancozeb

□ Maneb

□ Dithane

□ Penncozeb

□ Manzate

### 2007 OS Usage

13% Coppers

□ Champ

□ Kocide

□ Top Cop

□ Nu-cop

□ Ferbam 4%

□ Indar 2%

□ Aliette 2%

□ Ridomil <1%



# Know Your Products

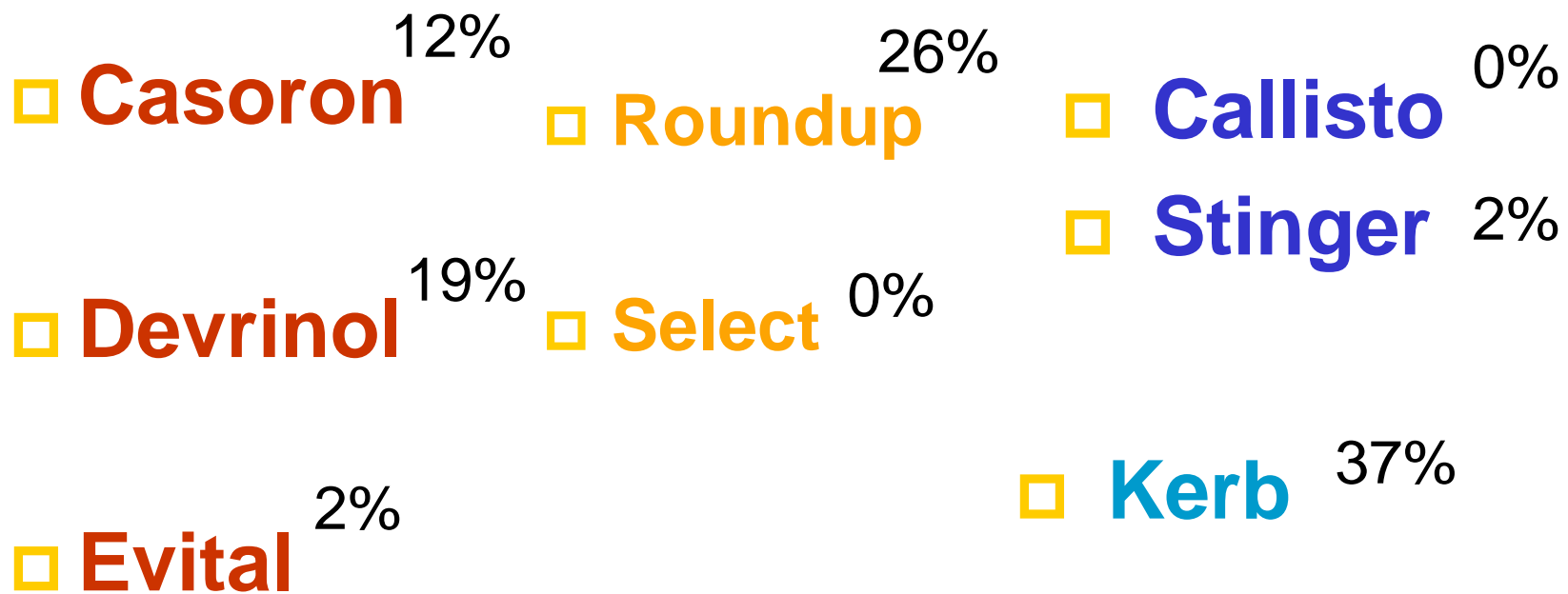
## HERBICIDES

- **Casoron**
- **Roundup**
- **Callisto**
- **Devrinol**
- **Select**
- **Stinger**
- **Evital**

# Know Your Products

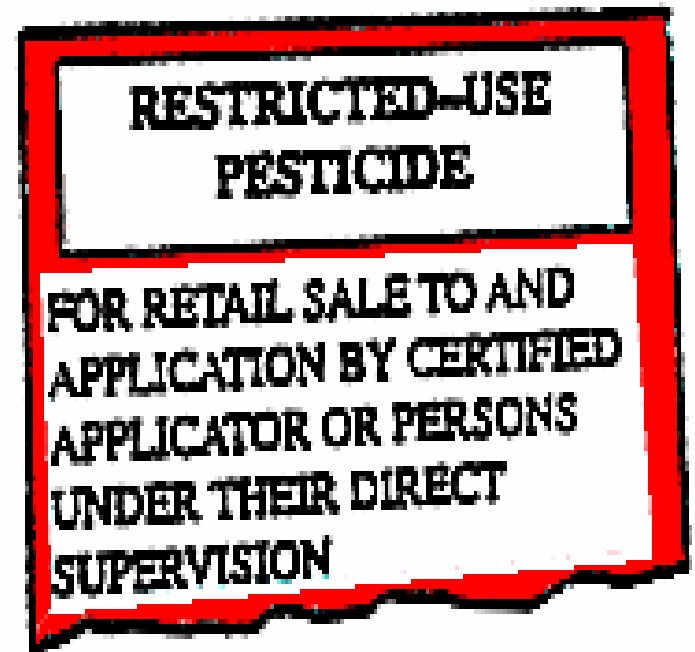
## HERBICIDES

### 2007 OS Usage



# Restricted Use Pesticides

- Not all restricted use pesticides are because of human toxicity.
- Know which ones are!!
- Lorsban and Diazinon
- Bravo, Intrepid, Actara
  - groundwater concerns



# LORSBAN and DIAZINON


When handling the concentrate...

- ❑ Wear a protective suit that covers all parts of the body except head, hands, and feet.
- ❑ Coveralls over long-sleeved shirt and long pants
- ❑ Wear chemical resistant gloves, chemical resistant apron, and chemical resistant footwear and socks.
- ❑ Wear goggles or a face shield and a NIOSH approved pesticide respirator (TC-21 C).

# LORSBAN and DIAZINON

During application, while repairing or cleaning equipment, or during reentry before the REI is up... WEAR...

- Long-sleeved shirt and long pants
- Shoes and socks
- Chemical resistant gloves
- Chemical resistant apron



mixing and loading

# NEW SECTION ON SOME LABELS

“See Engineering Controls for additional requirements”

## Engineering Control Statement

- “When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides, the handler PPE requirements may be reduced or modified as specified in the WPS Using engineering controls” (Bravo Weatherstik)
- “Water soluble packets, when used correctly, qualify as a closed mixing/loading system under WPS” (Lorsban 50W water soluble packets, Lorsban 75 WG)
- When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240 (d)) the handler PPE requirements may be reduced or modified as specified in the WPS. (Callisto)



## WPS 40 CFW 170.240 (d) (4)

- (4) Closed systems. If handling tasks are performed using properly functioning systems that enclose the pesticide to prevent it from contacting handlers or other persons, and if such systems are used and are maintained in accordance with that manufacturer's written operating instructions, exceptions to labeling-specified personal protective equipment for the handling activity are permitted as provided in paragraphs (d)(4)(i) and (ii) of this section.



## All Other Pesticides still require...


- Long-sleeved shirt and pants
- Shoes and socks
- Chemical resistant gloves

# All Other Pesticides still require...

- Longsleeved shirt and pants
- Shoes and socks
- Chemical resistant gloves

But Imidan requires...

- Respirator TC-21 C



**May be fatal  
if swallowed, inhaled,  
or absorbed  
through the skin**

# All Other Pesticides still require...

- Long-sleeved shirt and pants
- Shoes and socks
- Chemical resistant gloves

But Nexter requires...

- Respirator TC-21 C
- Protective Eyewear



**May be fatal  
if inhaled**


**Causes moderate  
eye irritation**

# All Other Pesticides still require...

- Long-sleeved shirt and pants
- Shoes and socks
- Chemical resistant gloves

But Kocide requires...

- Protective Eyewear



**Causes  
substantial but  
temporary eye injury**

## All Other Pesticides still require...

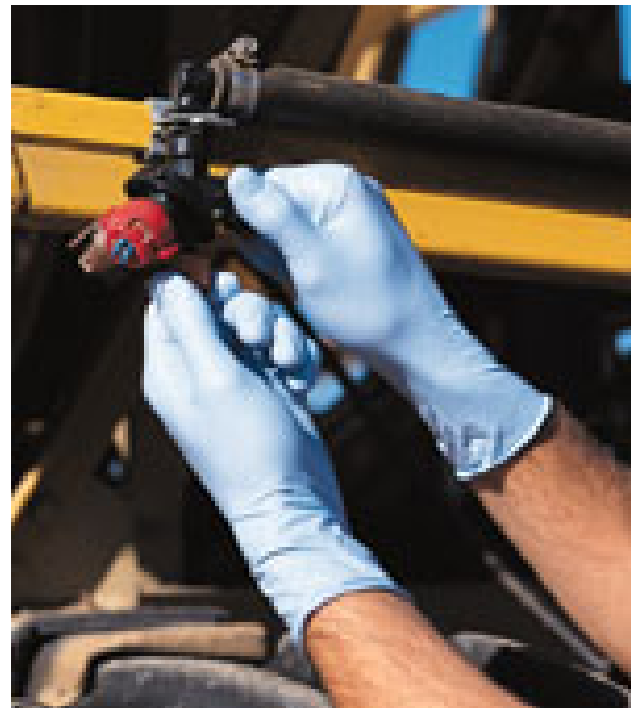
- Long-sleeved shirt and pants
- Shoes and socks
- Chemical resistant gloves

## But Dithane require...

- Protective Eyewear
- Chemical resistant apron
  - when mixing and loading

# GLOVES

- Chemically Resistant
  - Nitrile
  - Butyl
  - Neoprene
  - Natural Rubber
  - Barrier Laminate



**Disposable Nitrile gloves**



# Why worry about gloves?

- Studies show that farmers working with pesticides reduced their exposures tenfold when they used the proper gloves.
- Pesticide handlers get the most exposure on their hands and arms.





# Choosing the right glove

## - label requirements

### ■ READ THE LABEL

- Look under PPE (personal protective equipment)
- Usually on the first page of the label
  - Glove type – Category A-H
  - if not specified use chemical resistant for Category A
    - waterproof

### ■ If specified - use the category called for.

### ■ Gloves should be at least 14 mils thick (0.014 inch).

- Exception is barrier laminate -- Silver shield is 0.004"

## EPA CHEMICAL RESISTANCE CATEGORY SELECTION CHART

*For use when PPE section on pesticide label lists a chemical resistance category*

SELECTION CATEGORY LISTED ON PESTICIDE LABEL	TYPE OF PERSONAL PROTECTIVE MATERIAL							
	Barrier Laminate	Butyl Rubber > 14 mils	Nitrile Rubber > 14 mils	Neoprene Rubber > 14 mils	Natural Rubber* > 14 mils	Polyethylene	Polyvinyl Chloride (PVC) > 14 mils	Viton > 14 mils
A (dry and water-based formulations)	high	high	high	high	high	high	high	high
B	high	high	slight	slight	none	slight	slight	slight
C	high	high	high	high	moderate	moderate	high	high
D	high	high	moderate	moderate	none	none	none	slight
E	high	slight	high	high	slight	none	moderate	high
F	high	high	high	moderate	slight	none	slight	high
G	high	slight	slight	slight	none	none	none	high
H	high	slight	slight	slight	none	none	none	high

*\*Includes natural rubber blends and laminates*



# Cranberry pesticides - which gloves?

## ■ Herbicides

- Select and Poast – Category G
  - barrier laminate or >14 mil Viton
- all others: waterproof
  - (Category A implied)

## ■ Fungicides

- All are stated or implied Category A
- BUT check your label

# Cranberry pesticides - which gloves?

## ■ Insecticides

### – Sevin XLR+

- Category E
- Barrier laminate
- nitrile rubber
- neoprene rubber
- Viton

### – All other Sevin formulations –

- Category A



Barrier laminate



# Cranberry pesticides - which gloves?

## ■ Insecticides

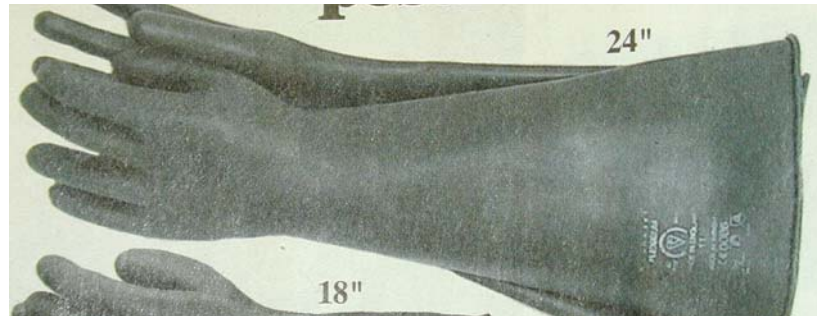
- Diazinon – Category F
  - Barrier laminate, butyl or nitrile rubber, or viton
- Lorsban 4E/Nufos 4E – Category G
  - Barrier laminate or viton
- Lorsban 75WG/Chlorpyrifos 4E-AG – Category H
  - Barrier laminate or viton



# Cranberry pesticides - which gloves?

## ■ Insecticides

- Spintor and Delegate: no gloves listed
- Assail: Waterproof Gloves (Cat. A)
- Actara, Avaunt: Waterproof Gloves (Cat. A)
- all others: waterproof (Category A implied)



Natural rubber



Nitrile



Neoprene



Barrier laminate

NO CLOTH  
CUFFS !!  
No linings !!



# No perfect solutions

- Laminate gloves protect from all categories but can tear and are non-dextrous
- Disposables are easy to work in but not thick enough - all plastic and rubber require >14 mil
- Try thinner gloves over the laminates - get the advantage of both



# No lined gloves - but liners allowed

- All agricultural workers (harvesters, cultivators, pesticide handlers) are permitted to wear separable glove liners beneath chemical-resistant gloves.
  - Workers may choose when to wear the liners.
  - The liners may not be longer than the chemical-resistant glove so that they do not extend outside of the glove.
  - The liners must be disposed of after 8 hours of use, or at the end of the work day, whichever comes first.





# Choosing gloves for fit

- Too loose - lose dexterity
- Too tight - bind hands and may tear more easily
- Assure that pesticide can't run down into the glove
- The glove should be at least 12 inches long (half-way to elbow) but longer if reaching into containers.



# Cleaning your gloves

- Wash the gloves on your hands
- Remove carefully - don't use your teeth!!
- Wash your hands
- If you plan to use again - wash in bucket of heavy-duty detergent solution right away - the jury's out on submerging



# Inspect your gloves

- Leaky gloves are much worse than no gloves - chemical gets in and is trapped near your skin.
- Check for tears, pinholes, and signs of chemical damage - even new gloves!
- Keep a spare pair handy (seal in a zipper bag to keep clean)



# All gloves are permeable

- It's just a matter of time.
- Even barrier laminate is rated for only 4 hours of constant exposure.
- Make glove replacement a high priority.
- Replace after 5-7 days of use (10-14 if a heavy duty glove).
- Look for signs of wear but remember - it doesn't always show.

# Personal Protection Equipment

- Coveralls

- Gloves

- Boots

- Eyewear

- Respirator

- Apron

- Hat





# CLOTHING/COVERALLS

- ❑ EVERY pesticide label requires long-legged pants and long-sleeved shirt.
- ❑ Coveralls always provide more protection.
- ❑ Disposable coveralls are a good idea for pesticide use
- ❑ Waterproof suit

# Personal Protective Equipment

- Must be provided by employer
  - “Companies are required to make available to all workers whatever protective equipment is required for handling the chemicals they use”
- PPE should be identified
- Training should be provided
- Company should implement and enforce PPE program



# FOOTWEAR

~~□ Shoes - Leather, Canvas, Fabric~~

□ Chemical Resistant Footwear or Boots:

- Chemical Resistant Shoes
- Chemical Resistant Boots
- Chemical Resistant Shoe Covering



# BOOTS



PVC BOOTS



VINYL  
BOOTS



# EYEWEAR

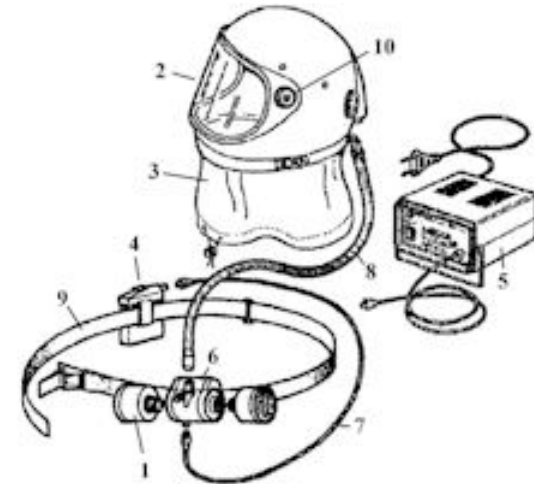
- Protective Eyewear
  - Shielded Safety Glasses
  - Face Shield
  - Goggles
  - Full Face style respirator



# Respirators

MUST HAVE NIOSH/MSHA APPROVAL

- Dust/mist filtering - dusts, powders, mists, and sprays. TC-21C
- Vapor removing - gases and vapors.
  - TC-23C - cartridge for organic vapors + prefilter
  - TC-14G - canister for pesticides/organic vapors



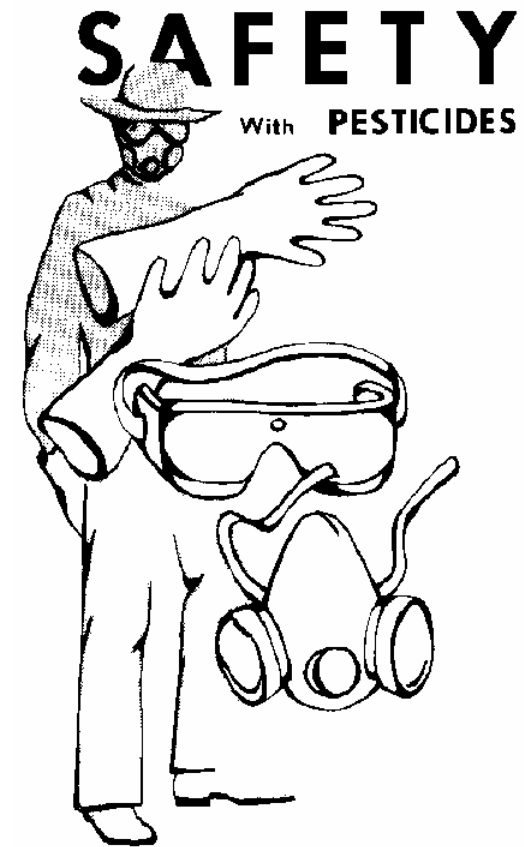
# Extra Protection

- Apron
  - Chemical resistant
  
- Hat or Hood
  - Chemical resistant
  - Full hood as part of respirator
  - Not ball cap used all season



# Clean Equipment!!

- ❑ Protective equipment should be cleaned *after every use.*
- ❑ Soap and water!!
- ❑ Dispose of heavily contaminated PPE



**HAZARD = EXPOSURE x TOXICITY  
(or RISK)**

The best way to avoid a pesticide poisoning is to protect yourself by reading the label and wearing personal protective equipment.

