



UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Pesticide Use & Safety



Amy Ouellette
Agricultural Resources
Belknap County

Regulation

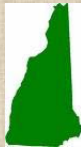


• **Federal**
Environmental Protection Agency



• **State of New Hampshire**
*Division of Pesticide Control,
NH Dept. of Agriculture*

Pesticide:



"Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any insects, rodents, fungi, weeds or other forms of plant or animal life or viruses which the board declares to be a pest..."

NH Code of Administrative Rules - Pes 101.18

Pesticide Classifications

Anyone can use:

- General use = over-the-counter

Pesticide license required for:

- Restricted use
- Prohibited limited use
- Prohibited

Pesticide Types

insecticide



herbicide



fungicide



Pesticide Types

rodenticide



miticide/acaracide



Pesticide Types



fumigant



nematicide



bactericide

Pesticide Types



repellent



disinfectant



plant growth
regulator

Herbicides control weeds

- Contact
- Translocated
- Specific action within the plant



Insecticides control insects



- Contact
- Stomach poison
- Systemic
- Attractants
- Repellents

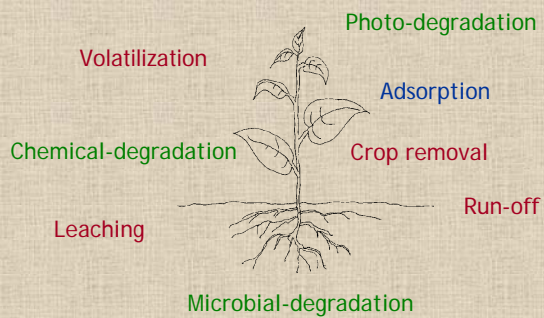
Fungicides control fungal diseases

- Protectant
- Eradicant



photo by Tom Zitter

Fates of Pesticides



Residue

the deposit of pesticide that remains on a surface (leaves, skin, soil) or in a harvested plant or animal

controls
pests



contaminates
soil, water,
food

Tolerance

the maximum pesticide residue that EPA allows on or in treated crops and animals or animal products sold for food or feed

Residue studies are conducted to establish tolerance.

Risk Cup

Food
Home
Water
Garden
Pets



Tolerance

- Negligible residue tolerance
- Preharvest intervals - "Days to Harvest"



Lethal Dose 50 (LD₅₀)

LD₅₀ is a measure of toxicity; for pesticides, it's expressed as mg/kg body weight

Dose that kills 50% of test species

The lower the LD₅₀, the more toxic a pesticide is.

Toxicity Rating for Select Chemicals

| Chemical | Oral LD ₅₀ | Dermal LD ₅₀ |
|--------------------------|-----------------------|-------------------------|
| Bordeaux mix | > 10,000 | > 2,000 |
| limestone | 7,300 | |
| <i>B. t. israelensis</i> | > 5,000 | > 2,000 |
| glyphosate | 5,000 | > 5,000 |
| pyrethrin | 1,500 | > 1,800 |
| carbaryl | 250 | > 4,000 |
| caffeine | 200 | |
| rotenone | 50 - 75 | > 940 |
| rotenone | 50-75 | 285 |

Lower LD₅₀ = more toxic

Symbol Words

| Category | Signal word | Oral LD50 (mg/kg body weight) | Dermal LD50 (mg/kg body weight) | Approx. lethal oral dose |
|----------------------|---------------|-------------------------------|---------------------------------|--------------------------|
| Highly Toxic | DANGER-POISON | 0 – 50 | 0 – 200 | few drops - 1 t. |
| Moderately Toxic | WARNING | 50 – 500 | 200 – 2,000 | 1 t. - 1 oz. |
| Slightly Toxic | CAUTION | 500 – 5,000 | 2000 – 20,000 | 1 oz. - 1 pt. or 1 lb. |
| Relatively Non-Toxic | CAUTION | > 5,000 | > 20,000 | >1 pt. or 1 lb. |

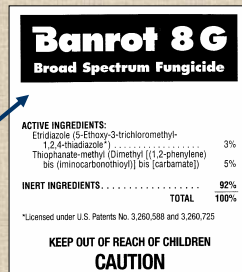
Highly toxic pesticides must be labeled with skull & crossbones.



What's on a pesticide label?

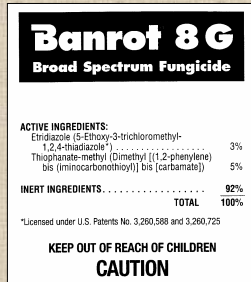
product, brand or trade name

type of pesticide



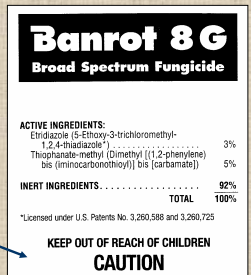
What's on a pesticide label?

ingredients
active
inert



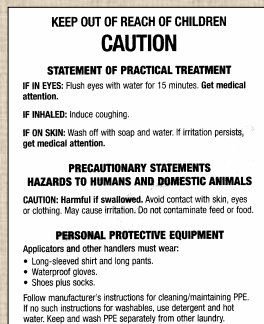
What's on a pesticide label?

signal word



What's on a pesticide label?

statement of practical
treatment (first aid)



What's on a pesticide label?

storage & disposal

STORAGE AND DISPOSAL

STORAGE: Do not store near seeds or fertilizer. Keep container closed when not in use.

PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

PESTICIDE DISPOSAL: Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to applicable federal, State or local procedures.

CONTAINER DISPOSAL: Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If drum cannot be reused, dispose of in the same manner.

What's on a pesticide label?

REI =
restricted
entry
interval



AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

EXCEPTION: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.


What's on a pesticide label?

manufacturer



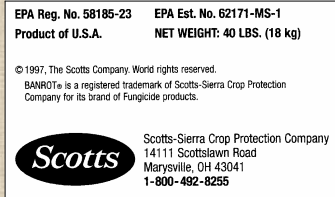
| | |
|-----------------------|-----------------------------|
| EPA Reg. No. 58185-23 | EPA Est. No. 62171-MS-1 |
| Product of U.S.A. | NET WEIGHT: 40 LBS. (18 kg) |

© 1997. The Scotts Company. World rights reserved.
SARRO® is a registered trademark of Scotts-Sierra Crop Protection Company for its brand of Fungicide products.

 Scotts-Sierra Crop Protection Company
14111 Scottslawn Road
Marysville, OH 43041
1-800-492-8255

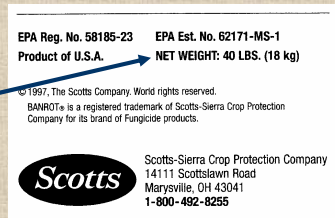
What's on a pesticide label?

EPA
registration
&
establishment
numbers



What's on a pesticide label?

net contents



Application methods

- Broadcast
- Spot treat
- Drench
- Band
- Dip
- Foliar
- Sidedress
- Aerial



Equipment

duster



advantages

- lightweight
- inexpensive
- no water required
- reaches cracks & crevices

disadvantages

- high likelihood of drift
- high visibility
- difficult to control

Equipment

hand held & backpack sprayers



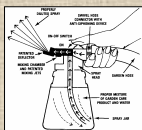
advantages

- economical
- simple to operate
- easy to control spray

disadvantages

- nozzles get clogged
- limited size (but heavy!)
- manual agitation req.

Equipment



hose-end sprayer

advantages

- inexpensive
- good coverage
- easy to operate

disadvantages

- requires garden hose
- calibration???
- high water volume = high pesticide usage

Equipment



drop & rotary spreaders

advantages

- lightweight
- simple to operate
- easy to calibrate
- no water needed

disadvantages

- limited use
- non-target contact
- openings get clogged

Pesticide Formulations

Merit® 75 WP

**Scotts
Zyban WSB**

**ZENECA Ag Products
PIRIMOR® 50-DF
INSECTICIDE**

Surpass[®] V EC

Liquid Formulations

- **Solution (S)**
 - Active ingredient (a.i.) in a liquid carrier
 - Applicator mixes it w/ water
 - Completely soluble in water
- **Ready-to-use (RTU)**
 - Low-concentrate formulation
 - Good for homeowners

Liquid Formulations

- **Flowable (F) and Liquid (L)**
 - a.i. impregnated on clay, ground to a fine powder, powder suspended in small amount of liquid
 - Applicator mixes it w/water
 - Requires agitation to keep in suspension
 - Easily absorbed into skin
 - Thick formulation

Liquid Formulations

- **Emulsifiable concentrate (EC)**
 - a.i. dissolved in oil, emulsifier added to enhance mixing
 - Applicator mixes it w/ water
 - Little agitation needed
 - Easily absorbed into skin
 - Cloudy when mixed with water

Liquid Formulations

- **Aerosol**
 - a.i. mixed with a solvent
 - Ready to use - no mixing necessary
 - Low concentrate of a.i.
 - 2 types
 - RTU in pressurized sealed container
 - Smokes or fogs, not under pressure

Dry Formulations

- **Dust (D)**
 - Low concentrate of a.i. mixed w/ clay, talc or ground nutshells
 - Used for seed treatments, spot treatments for cockroaches, flea control for pets
 - High potential for drift

Dry Formulations

- **Bait**
 - a.i. mixed with food, placed in a bait station (ant trap) or squeezed along cracks in buildings with a bait gun (pastes and gels)
 - Used for control of ants, roaches, rodents, slugs

Dry Formulations

- **Granule (G)**
 - Coarse particles of clay or nutshells containing a.i., large and heavy compared to dust
 - Applied to the soil (weeds, insects)
 - Applied to water (larval stage of mosquitoes)
 - Release a.i. slowly
- **Pellet (P)**
 - same as G but uniformly sized

Dry Formulations

- **Wettable powder (WP)**
 - Finely ground like dust, high conc. of a.i.
 - contains wetting & dispersing agents
 - Mixed with water before using as a spray
 - Particles are suspended in water
 - Requires agitation to keep in suspension
 - Excellent residual activity
 - High risk of inhalation – very concentrated

Dry Formulations

- **Soluble powder (SP)**
 - Similar to WP but dissolve into a true solution when mixed with water
 - Needs agitation to mix but stays in sol'n
 - High risk of inhalation – very concentrated

Unique Formulations

- **Microencapsulated (ME)**
- **Water-soluble packets or bags (WSB)**
- **Impregnates (pet collars)**
- **Pesticide/fertilizer combos (weed & feed)**
- **Fumigants**
 - liquid under pressure turns to gas when released or solid that releases gas in high humidity

Container Disposal

*"All pesticide containers shall be triple rinsed with an appropriate solvent...The rinsate and container shall be disposed of in a manner consistent with the **label directions** and in compliance with federal and state requirements."*

RSA 430:31 Pes 801:04

Usually, water is the solvent.

Storage

- Follow directions on the label
- Label must be legible & attached to container
- Store away from food, seed & animal feed
- Keep away from children & pets
- Storage room should be dry & protected from temperature extremes

Tank Mix

- Common examples
 - Fungicide and insecticide for fruit trees
 - Two herbicides for weed control
 - Insecticide and fertilizer for turf
- Compatibility
 - Usually pesticides with same formulations mix ok
 - Pesticides can be tank mixed if labels does not prohibit doing so
