Pesticide Safety and Usage for Master Gardeners

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Pesticides

• Chemical used to control a pest



Pesticides Include:



Miticides





Repellents



Herbicides





Acaricides





Rodenticides







Attractants



Growth Regulators

Bactericides

Pest Management Begins with Accurate Identification

- Problem may not be pest-related
- "Suspect" may be a beneficial organism
- Selection of best control measure
- Proper timing of application

Types of Pests

- Diseases (fungi, bacteria)
- Nematodes (microscopic roundworms)
- Insects (six legs)
- Arachnids (eight legs): spiders, mites, ticks
- Weeds
- Mollusks (snails, slugs)
- Vertebrates (rodents, birds)

Pest Control Goals

• Prevention

- fungus diseases
- Suppression
 - o reduce to an acceptable level
 - o most insects
- Eradication
 - o isolated infestations

Pest Control Guidelines

- Only when pest is causing, or expected to cause, more harm than is reasonable to accept
- Use a control strategy that will reduce pest numbers to an acceptable level
- Do as little harm as possible to everything except the pest

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Information to Gather

- Pest life cycles and habits
- Pest population size and distribution
- Factors that attracted the pest to the site
- Management options
- Ways to prevent future problems

Threshold Levels

- Levels of pest populations at which one should take pest control action in order to prevent unacceptable injury or harm.
- May be based on aesthetic, health, or economic considerations.
- May be set at zero.

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IPM Tactics
Host resistance
Biological controls
Cultural controls
Mechanical controls
Sanitation
Chemical controls

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Pesticide Terms to Know

- Mode of Action (MOA):
 - Stomach Poison
 - Nerve Poison
 - Desiccant
- Systemic
- Contact
- Translocated

Selective
Nonselective
Protectant
Curative (fungal)
Repellant

Reasons for Pesticide Failure

- Incorrect pest identification
- Incorrect pesticide
- Incorrect rate or timing
- Improper equipment or calibration
- Infestation after control applied
- Pest resistance

Avoid Pest Resistance to Pesticides

• Rotate pesticide families

• Use pesticides only when necessary

• Practice IPM principles

THE LABEL IS THE LAW

The Federal Agency responsible for pesticide registration is the Environmental Protection Agency (EPA). Virginia Agency responsible for the certification of pesticide applicators is the Virginia Dept. of Agriculture & Consumer Services.

PULL HERE TO OPEN

RESTRICTED USE PESTICIDE DUE TO TOXICITY TO FISH AND AQUATIC ORGANISMS FOR RETAIL SALE TO AND USE ONLY BY CERTIFIED APPLICATORS, OR PERSONS UNDER THEIR DIRECT SUPERVISION, AND ONLY FOR THOSE USES COVERED BY THE CERTIFIED APPLICATOR'S CERTIFICATION.

GROUP 3 INSECTICIDE

Insecticide

Active Ingredient:	
Lambda-cyhalothrin ^{1,2}	22.8%
Other Ingredients:	77.2%
Total:	100.0%
Warrior II with Zeon Technology contains 2.08 lbs. of active ingredient per gal. and is a	

capsule suspension.

¹CAS No. 91465-08-6 ²Synthetic pyrethroid Contains petroleum distillate.

KEEP OUT OF REACH OF CHILDREN. WARNING / AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See additional precautionary statements and directions for use in booklet.

EPA Reg. No. 100-1295 EPA Est. 39578-TX-1 Product of the United Kingdom

Formulated in the USA

SCP 1295A-L2B 0709 304012

1 gallon

Net Contents

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Label

- **Product Name**: Name of the manufacturer (ChemCo), the product name (NoPest), and the function of the product (Insect Killer).
- Ingredient Statement: active ingredient by percent (8.0%), common name (deltathion) and chemical name (1,2 phospho-(5)-4-chloromethane)
- o Toxicity Signal Word: Caution, Warning, or Danger
- EPA Registration Number (999-000) is a code number that identifies the product by number according to EPA's product registration database.

Label Continued...

•Precautionary Statements:

- Hazards to Humans and Domestic Animals
- Prescribes first aid measures and information for a physician
- •Environmental Hazards
- Physical or Chemical Hazards

Label Continued...

• Directions for Use:

- Violation of Federal (and State) law to use the product in a manner inconsistent with its label directions.
- How much to use, on what pest, and on what crops.
- Product cannot be used on any other crops, especially food crops.

o Storage and Disposal

- Name and address of the manufacturer and the EPA Establishment Number (EPA Est. No. 999-VA-1) which is important if the product is defective
- EPA recently added a "bee advisory box" to pesticide labels (Pg: 1-14).



Understanding Signal Word

Signal Word	Toxicity	Approx. Lethal Dosage
Caution	Low	More than an ounce
Warning	Moderate	Teaspoonful - tablespoonful
Danger	High	Drop – teaspoonful
DANGER POISON	ricted Use ONLY	See below for PRECAUTIONARY STATEMENTS, DIRECTIONS FOR USE and CONDITIONS OF SALE AND WARRANTY. POISON BASF Corporation Agricultural Products 20 Davis Drive Research Triangle Park, NC 27709 Research Trian



Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

COMBINE WITH WEED-B-GON® WEED KILLER FOR LAWNS CONCENTRATE

To guickly kill all major broadleaf weeds in lawns. See the label of Weed-B-Gon[®] Weed Killer for Lawns Concentrate for more than 80 broadleaf weeds. Follow all directions and precautions on both product labels.

MIXING INSTRUCTIONS FOR COMBINATION SPRAY

Amount to Use: 1/2 fl oz (1 Tbs) of Weed-B-Gon[®] Chickweed, Clover & Oxalis Killer for Lawns + 1 fl oz (2 Tbs) Weed-B-Gon[®] Weed Killer for Lawns Concentrate per gallon of water for each 200 sq ft.

When using Ortho® Dial 'N Spray®: 1. Set dial to $1^{1/2}$ oz.

- 2. Add 3 fl oz (6 Tbs) of Weed-B-Gon® Chickweed, Clover & Oxalis Killer for Lawns + 6 fl oz (12 Tbs) of Weed-B-Gon[®] Weed Killer for Lawns Concentrate to sprayer jar. DO NOT add water.
- 3. Spray evenly over 1,200 sq ft until jar is empty.

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P.O. Box 190

Made in USA

1 Tablespoon (Tbs) = 3 teaspoons (tsp) 1 fl oz = 2 Tbs

STORAGE & DISPOSAL

STORAGE Store in original container in a safe place.

DISPOSAL Do not reuse container. Securely wrap partially filled or empty container in newspaper and put in trash.



Special formula for control of tough lawn weeds. Weed-B-Gon[®] Chickweed, Clover & Oxalis Killer for Lawns kills weeds right down to the roots without harming lawns

PRODUCT FACTS Treats 3,200 sq ft (approximate size of 1¹/₂ tennis courts) KILLS Chickweed, clover, ground ivy (creeping WEEDS charlie), oxalis, speedwell (veronica), wild violet & other tough lawn weeds ON LAWNS WHERE Bent, buffalo, fescues, Kentucky blue, rye & zoysia TO USE AMOUNT 1 fl oz (2 Tbs) / gal of water / 200 sg ft TO USE

Questions, Comments or Medical Information? Call 1-800-225-2883 🗖 www.ortho.com

Manufactured for The ORTHO Group 80% SIZE Marysville, OH 43040 12-digit UPC Form LB03262P010 EPA Reg. No. 239-2491 (non-suppressed) EPA Est. 239-IA-3', 58996-MO-1* For Position Only Superscript is first letter of lot number 0 71549 03945 5

Directions for Use

OPEN

Precautions

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Special Instructions for Food Crops

• <u>Preharvest Interval (PHI):</u> period of time between application and time that it is safe to eat the crop



Reading a Pesticide Label

Misuse Statement

Directions for Use

 WEEDS CONTROLLED

 Black medic, Carolina geranium, chickweed (common & mouseear), cinquefoil, clover, creeping charlie, dandelion, evening primrose, Florida pusley, ground ivy, ironweed, lespedeza, morning glory (bindweed), oxalis, pennywort, plantains, red sorrel, speedwell (veronica), spurge (garden & spotted), thistle, wild onion, wild violet & yellow rocket

 MIXING INSTRUCTIONS
 Amount to Use: 1 fl oz (2 Tbs) per gallon of water for each 200 sq ft

 When using Ortho® Dial 'N Spray®: 1. Set dial to 1 oz. 2. Add 6 fl oz (12 Tbs) to sprayer jar. DO NOT add water.

It is a violation of Federal law to use this product in a manner

3. Spray evenly over **1,200 sq ft** until jar is empty.

1 Tablespoon (Tbs) = 3 teaspoons (tsp)

DIRECTIONS FOR USE

inconsistent with its labeling.

1 fl oz = 2 Tbs

FOR BEST RESULTS MEASURE • To treat entire lawn: Use a tank or hose-end sprayer. Measure lawn. Calculate square feet by multiplying length times width. Spray evenly over measured area. • To spot treat individual weeds in lawns: Use a tank sprayer. Avoid mowing 1 to 2 days after application. MOW .____ WATER If lawn needs watering, water thoroughly before application. Rain or watering 24 hours after application will not wash away effectiveness. WHEN TO • Spray when: APPLY - weeds are actively growing - temperature is below 90°F ۶Ö-- air is calm to prevent drift to desirable plants Reapplication can be made in 2 to 3 weeks if necessary. • Newly seeded lawn can be sprayed after second mowing. IMPORTANT Not for use on bahia, Bermuda, centipede, kikuyu or St.

Not for use on bahia, Bermuda, centipede, kikuyu or St. Augustine lawns. Not for use on or around fruits, vegetables or flowers. If an ornamental shrub or tree is in the lawn, keep spray off foliage and exposed roots.

Reading a Pesticide Label

Hazards to Humans & Domestic Animals

Name & Address of Manufacturer



Adjuvants

Chemical added to a pesticide formulation to increase its effectiveness or safety

Keep pesticide in suspension
Improve cohesiveness and dispersion of spray
Increase coverage

Toxicity

- Acutely Toxic is how poisonous a pesticide is to an animal/human after a single dose.
- Chronic Toxicity is how poisonous a pesticide is after small, repeated doses over a period of time.
- HAZARD = EXPOSURE X TOXICITY



Each time you apply pesticides, you should:

- Avoid non-target organisms and surfaces.
- Operate equipment safely.
- Deliver the pesticide to the target.
- Check for appropriate delivery rate.

If a pesticide is spilled on someone's skin, you should immediately rinse with plenty of water. Penetrants and oils may allow faster movement through the skin.

PPE

- Be familiar with the required personal protective equipment needed for the job and in accordance with the label warnings.
- Pants, long sleeved shirt, closed toed shoes, gloves.
- Protective equipment should be cleaned after every use.

Spills

- Pesticide incidents that threaten lives must be reported the VDACS immediately, but at least within 48 hours.
- In case of a pesticide spill, be prepared and plan ahead by having proper protective equipment on hand.

Protection From Pesticides

Acute toxicity symptoms may include:

Headache Nausea Fatigue Muscle weakness Allergic skin response Salivation Dilated pupils

Dizziness Anxiety Seizures Vomiting Sweating Diarrhea Tremors/twitching

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Abbreviations for Formulations • A = Aerosol

- B= Bait
- D= Dust
- DF= Dry Flowable
- E/EC= Emulsifiable Concentrate
- F=Flowable
- G=Granules
- P=Pellets
- W/WP= Wettable Powder

Environment

- Everything around us
- Indoors and outdoors
 - o air, soil, water, plants, animals
 - houses, restaurants, offices, farms
- How will pesticide affect the immediate environment at the site of application?
- What are the dangers that the pesticide will move off site and cause harm to other parts of the environment?



Environmental Considerations

• Water Quality

- Ground water: water in aquifers
 - ~90% of rural residents depend on groundwater
 - Contaminate water by leaching and point source spills
 - Leaching increased in sandy soils, increase rainfall, irrigation, sinkholes, old wells etc.

Sources of Contamination

• Point Source

specific, identifiable
mix-load site activities
storage sites
improper disposal
Non-Point Source
non-specific
run-off into surface water
leaching into groundwater
drift



Environmental Considerations

• Water Quality

- Surface Water: water on top that runs off into aquifers.
 - Ex. Parking lots, heavy rains
- Don't apply pesticides before heavy rain or water area you just sprayed...unless label tells you to.
- Look at table on page1-29 to see runoff potential

Pesticide Movement in Water

• Runoff

• movement away from treated site in water or other liquid flowing horizontally across the surface.

Leaching

• movement downward through the soil.

• may result in ground water contamination.

Back-siphoning

- Siphoning of chemicals back to a water source due to interruption of flow by failure of pump, low water pressure, etc.
- Use an <u>air gap</u>, or
 Use a back-flow
 - preventer
- It is the law!

Keep your hose above the tank water level!

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Pesticide Factors and Ground Water

- Solubility, Adsorption, Persistence
- Pesticides that are highly soluble, moderately to highly persistent, and not strongly adsorbed to soil particles are most likely to leach and move directly into ground water.
- The labeling usually does not address these properties.

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Leaching to Groundwater



- Pesticides: low adsorptivity, high solubility, high persistence
- Soils: sandy, low organic matter, high rainfall or irrigation
- Site: high water table, direct access to groundwater



Environmental Considerations

- Drift= Pesticide movement away from release site through the air.
- Drift potential can be reduced by:
 - larger nozzle size
 - lower pressures
 - decreased distance from application site
 - not spraying during windy conditions

Vapor Drift

Fumigants (already in vapor form)
 Non-fumigants (change to vapor form)
 Certain formulations favor vapor drift

 2,4-D esters
 Certain conditions
 high temperature
 low humidity





Drift Potential

Low



Pesticide Movement

• Air

- wind currents
- ventilation systems
- Water
 - o runoff
 - leaching



Objects, plants, animals or people
move or are moved offsite

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Pesticide Movement

- Movement away from target: drift, leaching, etc...
- To minimize:
 - Avoid hot or windy days
 - Use low pressure w/large opening
 - Do not mix or load near water sources



Protecting Pollinators

- Do not apply pesticides to open blooms
- If needed, apply in evening after foraging
- Choose a more pollinator-friendly pesticide
- Do not use dusts
- Avoid applications at low temperatures

Sensitive Areas - Outdoors

- Conduits to ground water
 wells, sinkholes, tree roots, porous soil, etc.
- Surface water
- Schools, playgrounds, hospitals, etc.
- Endangered/threatened species habitats
- Apiaries, wildlife refuges, parks
- Non-target crops or plantings

Sensitive Areas - Indoors

- Areas where people live, work, cared for
 children, pregnant women, elderly, sick
- Food/feed storage and handling areas
- Animal living areas
 - o domestic and confined animals, aquaria
- Planting areas
 - o atria, indoor plants, sensitive plants
- Water and air handling systems

Sensitive Areas - Remedies

- Leave a buffer zone
- Take precautions
 - follow label and common sense
 - non-use in particular areas
 - consider advanced or low-risk chemistry, handling systems or methods
 - o remove animals, food, feed, utensils
 - cover or seal areas from chemical contamination

Harmful Effects From Residues

• Pesticide breakdown depends mostly on the chemical structure of the pesticide's active ingredient(s).

Also affected by environmental conditions:
 presence of microorganisms
 exposure to direct sunlight

• Persistent pesticides leave residues that remain in the environment for long periods of time.

• May **accumulate** in bodies of animals or in soil

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Exposure Routes



Signal words reflect most serious effect

Delayed Effects

- Illnesses that do not appear immediately
 - > 24 hours
 - Single OR repeated exposures
- Types
 - chronic effects
 - developmental and reproductive effects
 - systemic effects
- Effects are not well understood
 - Avoid by limiting exposure

Allergic Effects

- harmful effects to some people
- sensitization to substance (sensitizer)
- react after several exposures
 - systemic effects
 - asthma or even life-threatening shock
 - skin irritation
 - o rash, blisters, sores
 - eye and nose irritation
 - o itchy, watery eyes and sneezing

To Minimize Pesticide Exposure:

- Use integrated pest management (IPM) techniques to minimize pesticide use.
- Select the safest, effective formulation.
- Use a product with reduced concentration of active ingredient.
- Reduce rate of application to lowest effective level.
- Mix only enough pesticide to complete assigned task.

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To Minimize Pesticide Exposure:

- Select an application method that minimizes contact.
- Wear all Personal Protective Equipment (PPE) stipulated on the label
- Mixing pesticides usually requires more PPE than applying.
- Follow all safety precautions on the label.



To Minimize Pesticide Exposure:

- Comply with intervals for re-entry & harvest
- Wash hands before eating, smoking, and using the bathroom

To Minimize Exposure to Others:

- Wash pesticide contaminated clothing separately
- Store & mix pesticides in original containers & labeled mixing equipment -never in food containers
- Lock pesticides away from children

Pesticide Poisoning

- nausea, vomiting, diarrhea and/or stomach cramps
- excessive sweating, chills, and/or thirst
- chest pains
- difficult breathing
- muscle cramps or aches all over body



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Personal Protective Equipment (PPE)

- The label is very specific about the PPE required for mixing/loading, application, and early entry.
- Label lists PPE minimums. Can wear more.
- Applicator is legally required to follow all PPE instructions on label.
- Long-sleeve shirt, long pants, waterproof gloves, and shoes and socks are the minimum PPE found on any agricultural pesticide.

Spill Kit

- Shovel
- Broom
- Floor sweep, oil soak, kitty litter
- Bleach and activated charcoal



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Pesticide Storage

- Secure the site, post warnings
- Well-ventilated, avoid extreme heat or cold
- Always keep in the original containers
- Keep containers on shelves or pallets
- Use the storage area only for pesticides
- Keep clean-up materials nearby
- Empty drums and plastic bags for leaking containers

Pesticide Disposal

- Empty containers
- Excess mixture
- Excess formulation
- Rinse water

Excess Spray Mixture

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 Mix up only amount needed for job
 careful measurement and calibration
 Must be used on a labeled site

Excess Formulation

- Find a labeled site to use or give to someone who can use it according to the label
- Keep in original container
- Contact a hazardous waste contractor (can be very expensive)

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Questions?