Integrated Pest Management and Pesticide Safety for Master Gardeners

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IPM Definitions

Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

IPM Definitions

A science-based , decision-making process that uses information on pest biology, environmental data, and technology to manage pest damage in a way that minimizes both economic costs and risks to people, property, and the environment

-Taken From Nair, S. (2/15/23)
Arizona Pest Management Center

IPM Definitions

- Using multiple strategies, looking at environmental, as well as the economic feasibility of these options, taking into account the cost of the crop/yield/value. A zero-tolerance approach generally is not a good idea. Consider densities (of pests) when a pesticide is advantageous. It's looking at non-chemical options as well as chemicals.

IPM

- IPM emphasizes integrating complementary pest management strategies to maintain pests at economically acceptable levels

- Minimizes negative environmental impacts

- Pest eradication is impossible, but many times pest management is feasible

Integrated Pest Management

Why?

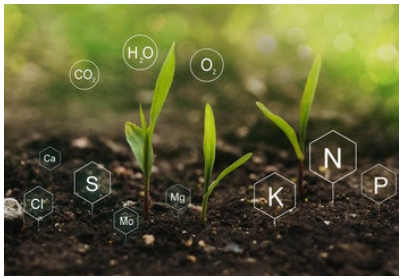
- Development of resistance among pests to pesticides
- Off-target application of pesticides and concentration of pesticides in environment and food chain

Principles of IPM

1. Approach pest management on a system level
2. Properly identify pest and enemies
3. Understand biology and life history of pest and enemies
4. Understand economic/action thresholds
5. Monitor pests, damage and treatment success
6. Use multiple techniques

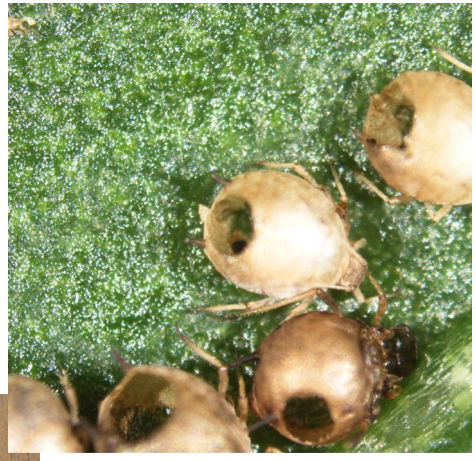
1. Whole System-level Thinking

- Consider all parts of your garden/land
  - Irrigation
  - Fertilizer
  - Cultural practices (pruning, thinning, etc)
  - Crop rotation
  - Fallow periods
  - Variety selection
  - Site evaluation
  - Biology



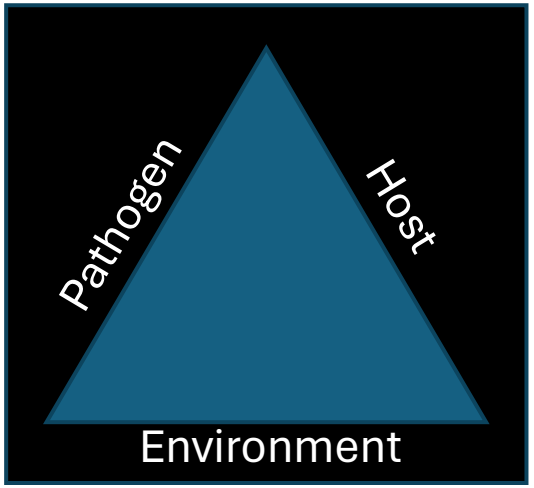
2. Pest and Natural Enemy Identification

- Accurately identify pests and their natural enemies
- Quantify (pests and/or damage)
- Alternative hosts



3. Understanding Pest and Host Biology

- Understand pest/predator biology/life cycle
- Habitat and conditions necessary for pest growth and reproduction
- What plant development stage does pest cause damage?
- What pest developmental stage is susceptible to management?



4. Action Thresholds

- It is not the goal to eradicate the pest
- Slow pesticide resistance
- Maintain beneficial populations
- Cost of loss VS. Cost of treatment
- At what point do you act to avoid unacceptable loss?

5. Monitoring: You must look to find…

- Quantify pest abundance
- Quantify natural enemy abundance
- May simply be presence/absence
- Understand the environment
- Keep good notes
- After-action monitoring to determine efficacy

6. Use Multi-Tactic Approaches

- Cultural practices
- Biological controls
- Chemical controls
- Physical controls

Selecting (and recommending) Proper Strategy

- Prevention vs Control
- There are often several choices
  - Pesticides or no?
- Think about people and environment first
  - Low toxicity to humans and off-target species
- Offer all reasonable, extension-approved options
  - Allow stakeholder to choose
  - Do not recommend home remedies
- Application timing depends on pest and host biology

Prevention of Pests: Using Resistant Cultivars

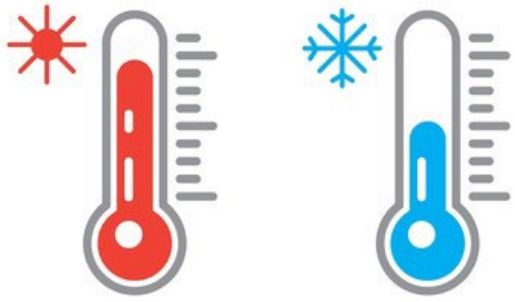
- Some varieties and species are more susceptible than others
  - Not immunity, resistance
    - Due to physical or chemical properties of plant
  - Check with seed catalog, etc…
  - Rootstocks

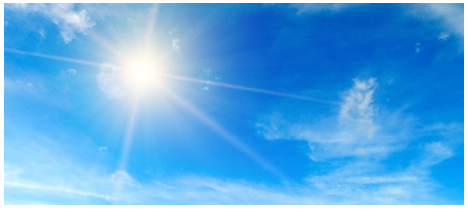
Prevention of Pests: Sanitary Practices

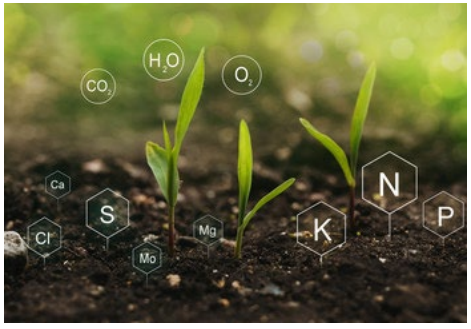
- Remove and dispose of infested or dead plants
- Use clean (pest and pathogen-free) plants
- Clean/sanitize tools
  - Bleach (up to 10%) soak
  - Ethanol or Isopropyl alcohol (wipe or dip in 70%)
  - Trisodium Phosphate (%10 TSP soak)
  - Lysol?
- Weed (seed) control
- Soil?

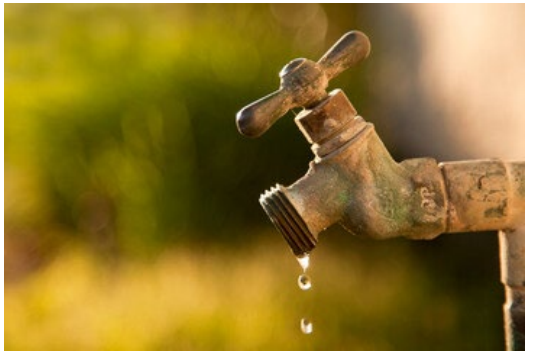
Prevention of Pe
Proper cultural pra

- Avoid unnecessary stressors
  - Site selection
    - Temperature
    - Humidity
    - Light
  - Irrigation (proper)
  - Fertility (proper)\
  - Canopy management



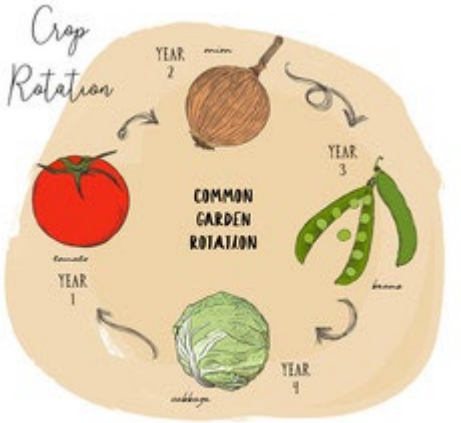






Nonchemical Control Options: Cultural Control

- Cultivation-reduce competition
- Crop Rotation-isolate pest from host
- Changes in planting/harvesting time-
  - delay planting until favorable conditions
  - Harvest before frost, rain, pest/pathogen arrival



Non-Chemical Control: Diversify your Garden

Encourage beneficial organisms

Hedging bets

Companion planting?

Nonchemical Control Options: Environmental Control

- Composting
- Solarization

Nonchemical Control Options: Mechanical Control

- Preventative mechanical devices
  - Grow tubes, bird net, floating row cover, mulches, sticky barriers
- Hand-picking pests
- Washing
- Traps
  - For monitoring or deterrence

Non-Chem Control: Biological Control Agents

- Activity of one species that reduces the effect of another
- Bio Control Agents include:
  - Pathogens (Bacillus thuringiensis, nematodes)
  - Parasitoids (often wasps or flies)
  - Predators (ladybird beetles, lacewings, antlions, assassin bugs, wheel bugs)
  - Competitors-cover crops, living mulches

Pathogen: Bacillus thuringiensis

- Bacteria that produces insecticidal crystal proteins, which cause cell death in digestive tract of insects
- Affects insects from:
  - Lepidoptera (moths and butterflies): Bt var. kurstaki-larval stage of leaf-feeding caterpillars
  - Diptera (flies): Bt var. israelensis- larval stage of mosquitos, black flies, fungus gnats
  - Coleoptera (beetles): Bt var. san diego & tenebrionis-larvae of Colorado potato beetle, elm leaf beetle, willow leaf beetle

Parasitoid: Parasitic wasps

- Adults of many species of wasp (Hymenoptera)
- Females often have a long ovipositor
- Most insect groups have a parasitic wasp
- Generally harmless to humans
- Provide flowering plants as nectar source for adults

Predator:Assassin Bug (Reduviidae)

- Generalist predator of pests (aphids to caterpillars)
- Use size and ambush techniques to kill prey with piercing/sucking mouthparts
- Careful handling, as they can hurt humans

Creating Competition: Planting

- Revegetation-seeding or planting to promote desirable species
- When desirable plants compete with invasive weeds, fewer resources are available for weeds
- Often most successful when incorporated with other strategies such as herbicide and cultivation

Bio Control Methods: Conservation

- Judicious use of pesticides
- Food sources for beneficials
- Organic matter for beneficial fungi

Bio Control Methods: Augmentation

Intentional release of natural enemies

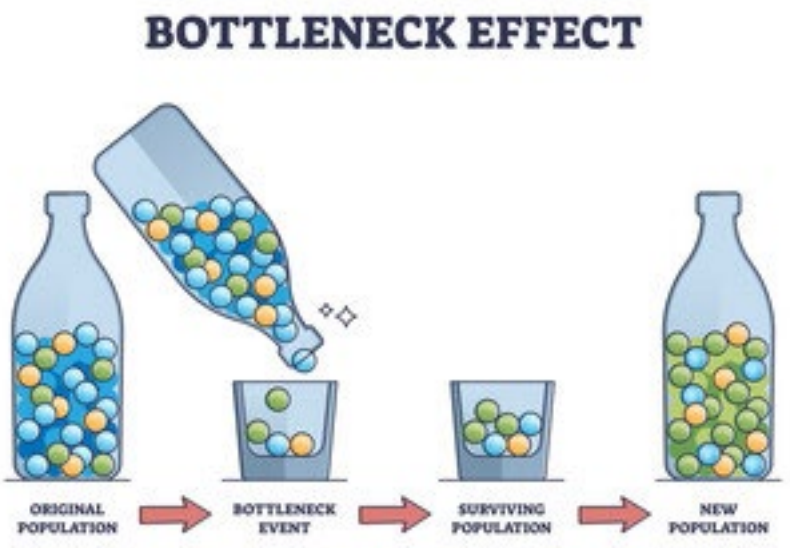
Efficacy??

IPM Economics

- Less pesticide use means less resistance
- Less/more efficient spraying means less cost of chemicals
- Do markets exist for crop diversity/rotation?

Pesticide Resistance

- Occurs when one type of pesticide is used repeatedly
- Organisms evolve in “real time” to develop resistance



Chemical Control
AKA: Pesticides

"-cide"= killer

Any substance or mixture of substances intended to:

- Prevent, destroy, control, repel or mitigate any pest organism

- Use after presence and action threshold identified
- After non-chemical methods fail
- ALWAYS read and follow the label

Why Should We Learn About Pesticides

- To be well-informed gardeners
- To stay safe
- To teach others

What are Pesticides?

A "pesticide" is any substance or mixture of substances intended to be used for preventing, destroying, repelling or mitigating insects, fungi, microbes, weeds, rodents, predatory animals or any form of plant or animal life that is, or that the director may declare to be, a pest and that may infest or be detrimental to vegetation, humans, animals or households or be present in any environment. In additional to Insecticides, fungicides, rodenticides, termiticides, fumigants, larvacides, adulticides, herbicides, avicides or molluscicides, all-natural or organic substances such as essential oils or water may be considered a pesticide.

-AZ Department of Agriculture

Pesticide Examples

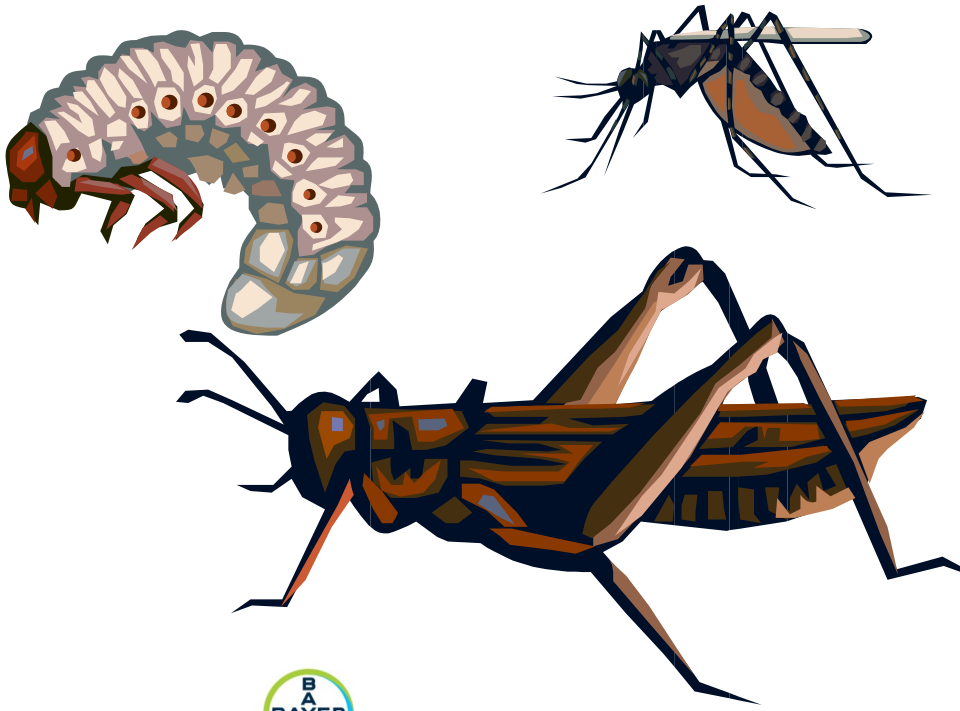
- Cockroach sprays and baits
- Insect repellents for personal use
- Insect pheromones (attract or confuse)
- Rat and other rodent poisons.
- Flea and tick sprays, powders, and pet collars.
- Kitchen, laundry, and bath disinfectants and sanitizers.
- Products that kill mold and mildew.
- Some lawn and garden products, such as weed killers.
- Some swimming pool chemicals.
- In some states, regulators, defoliants, desiccants, and adjuvants

Pesticide Categorization

- Target pest
  - Insecticide, Herbicide, Fungicide, Miticide, Molluscicide, Nematicide, Rodenticide
- Effect
  - Attractant, Repellent, Desiccant, Defoliant, Plant Growth Regulator
- Selectivity- broad or selective

Insecticides

- Stomach poisons
- Contact insecticides
- Systemic insecticides
- Growth regulators
- Dessicants



About Herbicides
Non-selective vs. Selective:

- Non-selective Herbicides
  - Kills all types of weeds (as per label)
- Selective Herbicides
  - Kills only a certain type of weed (as per label)

Specifics About Herbicides

- Pre-emergence
  - Kills germinating seeds
- Post-emergence
  - Kills emerged weeds
- Residual
  - Stays in soil for prolonged periods

Herbicides:
Contact vs. Translocated

- Contact Herbicides
  - Causes burning effect on leaves with little effect on roots
- Translocated Herbicides
  - Absorbed and translocated throughout plant

About Fungicides

- Diseases are often difficult to control
- Cultural practices are usually key – sanitation, irrigation, etc.
- Fungicides are often only effective prior to infection – creating a barrier to infection

Adverse Effects of Pesticide Use

There is always *some* hazard when using pesticides

- Human health
- Plant injury
- Unsafe residue levels
- Water pollution
- Pesticide resistance

Surfactants, Additives, Adjuvants

Added to a pesticide to enhance active ingredient, improve coverage, resist weathering, etc..

- Reduces surface tension between surfaces, keeps materials in suspension, improves coverage
  - Spreader
    - Improves contact and weatherability
  - Sticker
    - Improves adherence, usually oily
  - Wetting Agent
    - Reduces surface tension

Pesticides: Home vs. Professional

- General Use Pesticides
  - These pesticides are not likely to harm the environment when used according to label directions. Anyone can buy and use a general use pesticide.
- Restricted Use Pesticides
  - Considers:
    - Toxicity
    - Pesticide use
    - Effect on environment
  - Training and testing are requir
    apply restricted use pesticides (i.e., Certified Applicators).

Home Garden Pesticides: Pyrethrins

Botanical insecticide- Chrysanthemum spp.

- Paralytic
- Broad-spectrum
- Break down quickly
- Contact efficacy
- Use with other products synergistically
  - Piperonyl butoxide
  - Oil
  - Insecticidal soap

- **Kills mosquitoes, including those that may transmit West Nile virus and Chikungunya virus**
- **Kills mosquitoes, including the Aedes mosquito that may carry and transmit Zika virus**
- **Kills Flying Insects**
- **Kills Crawling Insects**
- **Kills Stored Product Pests**
- **Kills Cockroaches**

ACTIVE INGREDIENTS:

Pyrethrins	5.00%
*Piperonyl butoxide	25.00%
OTHER INGREDIENTS	70.00%
	100.00%

*(butylcarbityl) (6-propylpiperonyl) ether and related compounds.

KEEP OUT OF REACH OF CHILDREN

CAUTION

See inside for first aid and precautionary statements.

Home Garden Pesticides: Spray Oils

- No toxic residue
- Not toxic to humans
- Environmentally friendly
- Generally, “soft” on beneficials
- Effective on soft-bodied arthropods and fungi
- Suffocate or breaks down cuticular wax
- Do not apply when temperatures are high (above 90 F)

Home Garden Pesticides: Neem Oil

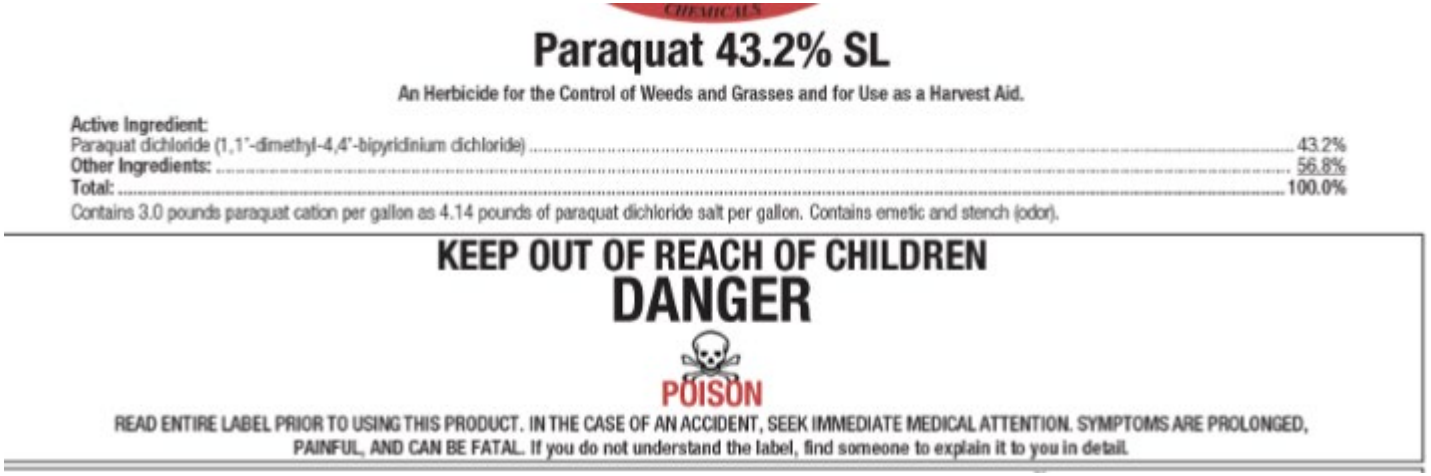
- Natural botanical pesticide made from crushed seeds of Azadirachta indica
- Contact or ingestion
  - Insect growth regulator (prevents molting)
  - Anti-feedant
  - Oviposition deterrent

Home Garden Pesticides: Insecticidal Soap

- Most effective on soft-bodied arthropods
  - Mites, aphids, whiteflies, and other plant-sucking arthropods
- Disrupts cell membranes and cuticle

Pesticide Labeling

- Label-information printed on or attached to container
- Consumer's source of information on how to use the product correctly, legally, and safely
- All labels should have specific information



Paraquat 43.2% SL

An Herbicide for the Control of Weeds and Grasses and for Use as a Harvest Aid.

Active Ingredient:	
Paraquat dichloride (1,1'-dimethyl-4,4'-bipyridinium dichloride)	43.2%
Other Ingredients:	56.8%
Total:	100.0%

Contains 3.0 pounds paraquat cation per gallon as 4.14 pounds of paraquat dichloride salt per gallon. Contains emetic and stench (odor).

KEEP OUT OF REACH OF CHILDREN

DANGER

POISON

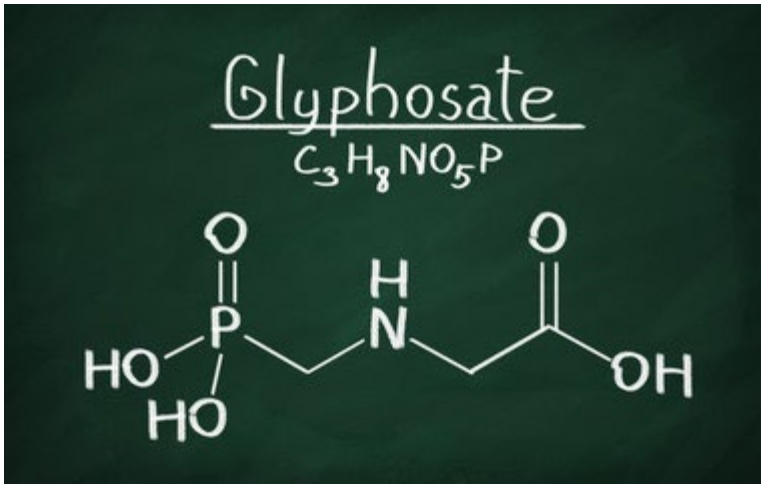
READ ENTIRE LABEL PRIOR TO USING THIS PRODUCT. IN THE CASE OF AN ACCIDENT, SEEK IMMEDIATE MEDICAL ATTENTION. SYMPTOMS ARE PROLONGED, PAINFUL, AND CAN BE FATAL. If you do not understand the label, find someone to explain it to you in detail.

Pesticide Labeling: Name

- **Brand Name –** plainly displayed and used to identify specific product
- **Common Name –** helps make active ingredients with complicated chemical names easier to identify
- **Chemical Name –** scientific name of pesticide

Pesticide Naming Example

- **Brand Name –** Roundup
- **Common Name –** Glyphosate
- **Chemical Name –**
  N-(phosphonomethyl)glycine



Pesticide Formulations

- RU-Ready to use-common for home gardeners
- EC(E)-Emulsifiable Concentrates-AI (active ingredient) is mixed with oil base, forming emulsion. Must be diluted with water
- Solutions(S)-once diluted in water or other solvent, doesn't require further agitation
- Flowables (F)-mixed with water to form a suspension. Requires constant agitation
- Wettable Powders (WP)-Active ingredient mixed with fine powder. Mixed with water and agitated frequently
- Granules (G)- Active ingredients added to coarse particles and applied directly

RESTRICTED USE PESTICIDE

Toxic to fish and aquatic organisms.

For retail sale to and use only by certified applicators, or persons under their direct supervision, and only for the uses covered by the certified applicator's certification.

GROUP 3A INSECTICIDE

BIFENTURE® EC

AGRICULTURAL INSECTICIDE

ACTIVE INGREDIENT:	BY WT.
Bifenthrin* (2 methyl[1,1'-biphenyl]-3-yl) methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate	25.1%
OTHER INGREDIENTS:**	74.9%
TOTAL	100.0%

*Cis isomers 97% minimum, trans isomers 3% maximum.
**Contain xylene range aromatic solvents
This product contains 2 pounds active ingredient per gallon.

EPA Reg. No. 70506-57

KEEP OUT OF REACH OF CHILDREN

WARNING AVISO

This label must be in the possession of the user at the time of application.
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.)

FIRST AID	
If swallowed	• Call a poison control center or doctor immediately for treatment advice. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give **any** liquid to the person. • Do not give anything by mouth to an unconscious person.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

NOTE TO PHYSICIAN

This product is a pyrethroid. If large amounts have been ingested, the stomach and intestine should be evacuated. Treatment is symptomatic and supportive. Digestible fats, oils, or alcohol may increase absorption and so should be avoided. Contains petroleum distillates. Vomiting may cause aspiration pneumonia.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. FOR EMERGENCY MEDICAL ASSISTANCE, CALL THE ROCKY MOUNTAIN POISON AND DRUG CENTER 1-866-673-6671.

FOR CHEMICAL EMERGENCY: Spill, leak, fire, exposure, or accident, call CHEMTREC 1-800-424-9300.

I
INSECTICIDE

NET CONTENTS: _____ GALLONS

UPI

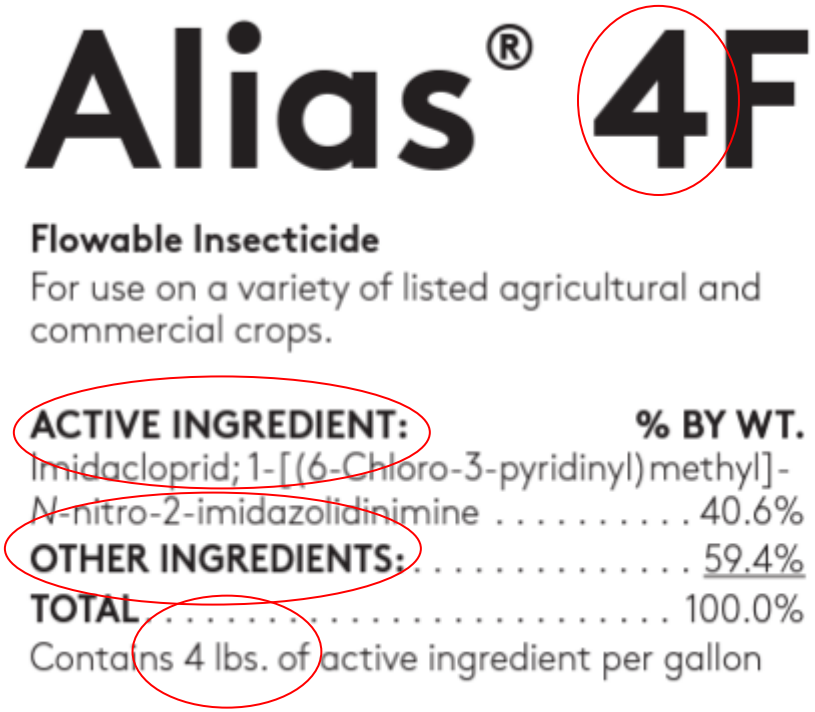
United Phosphorus, Inc. • 630 Freedom Business Center, Suite 402 • King of Prussia, PA 19406 U.S.A. • 1-800-438-6071

Pesticide Resistance Codes

- Codes represent modes of action/ manner in which pesticide works
- Rotating codes is important
  - Read label
- FRAC
- HRAC
- IRAC

Pesticide Labeling: Ingredients

- Active Ingredients: chemical(s) that control the pest
  - Must be on label (by weight)
- Other (Inert) Ingredients: carriers, adjuvants, etc.
  - Often proprietary; do not need to be on label



Pesticide Labeling: Signal Words

- (Child) Hazard Warning: most labels
- Near CHW, you will find a “signal word”
- Guide to toxicity or danger of product
- Must be extremely low toxicity to not have a signal word

KEEP OUT OF REACH OF CHILDREN
CAUTION

Hazard to Humans and Domestic Animals
EPA Reg. No. 62719-220
WARNING

KEEP OUT OF REACH OF CHILDREN
DANGER/PELIGRO

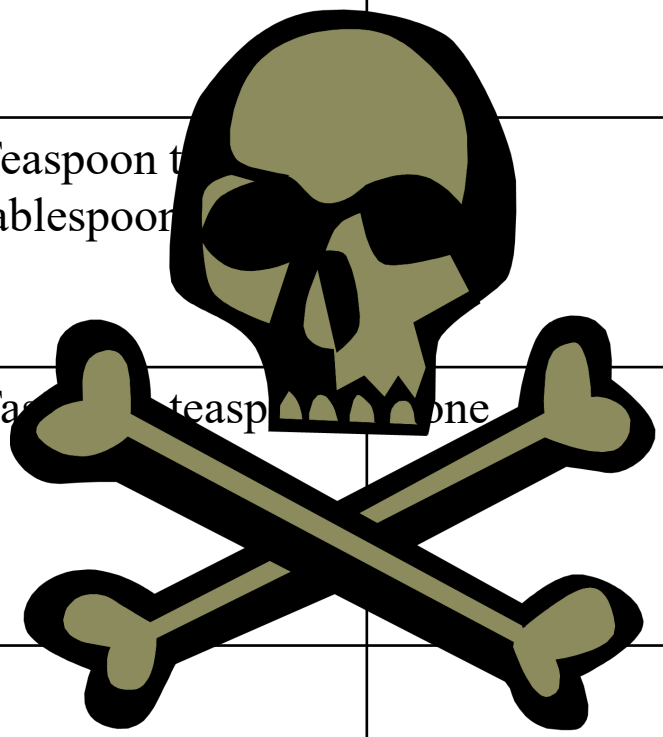
KEEP OUT OF REACH OF CHILDREN
DANGER

POISON

Pesticide Labeling
Signal Word Examples

- **Caution –** Neem Oil, Admire (Imidicloprid), Platinum (Thiamethoxam)
- **Warning –** Chlorpyrifos, Bifenthrin(pyrethroid), M-Pede (insecticidal soap)
- **Danger/Poison –** Paraquat
- **Danger –** 2, 4-D, Oxidate (hydrogen peroxide, peroxyacetic acid)

Signal Word	Route of Entry Statement:	Human Lethal Dosage	Symbol
CAUTION	Harmful if swallowed, inhaled, irritant	Ounce to a pint	None
WARNING	Harmful to fatal if swallowed, absorbed through skin, irritant	Teaspoon t tablespoon	
DANGER	Corrosive-causes eye damage/severe burns	Ta teasp one	
DANGER-POISON	Fatal if swallowed, poisonous if inhaled, extremely hazardous by skin contact		



Pesticide Labeling-Other Info.

- Manufacturer information
- EPA Registration Number
- Precautionary Statements
  - First aid information
  - Storage and disposal information
- PPE (Personal Protective Equipment)
- Environmental Hazards
- Restricted Entry Interval (hours until re-entry)

Site/Crop-Specific Information

- Product must be labeled for site, not necessarily pest
- Specific rates for crop, depending on level of control/ type of pest
- Crop specific application instructions
- Restrictions: e.g., no more than X applications or total volume applied per year
- PHI=Pre-Harvest Interval

GRAPES

Disease Control	Application Rate	Product Instructions
Powdery mildew (*Uncinula necator*)	6.0 to 8.6 fl oz/acre	Apply at the critical timings for disease control. Refer to University and/or extension guidelines for best application timings. Continue as needed on a 12- to 21-day interval. When disease pressure is severe, use the higher rates and/ or shorter intervals.
Botrytis bunch rot / Gray mold (*Botrytis cinerea*) Black rot (*Guignardia bidwellii*) Sour rot[1] (*various pathogens*)	8.0 to 8.6 fl oz/acre	Apply at the critical timings for disease control. Refer to University and/or extension guidelines for best application timings. Continue as needed on a 12- to 21-day interval. When disease pressure is severe, use the higher rates and/ or shorter intervals.
Disease Suppression	**Application Rate**	**Product Instructions**
Phomopsis cane and leaf spot (*Phomopsis viticola*)	8.6 fl oz/acre	Apply at the critical timings for disease control. Refer to University and/or extension guidelines for best application timings. Continue as needed on a 12- to 21-day interval. When disease pressure is severe, use the shorter intervals.

Restrictions:

- Do not apply more than 34 fl oz of LUNA EXPERIENCE per acre per year.
- Apply using ground, aerial, or chemigation equipment. Regardless of formulation or method of application, do not apply more than 0.446 lbs Fluopyram or 0.900 lbs tebuconazole per acre per year, including soil and foliar uses.
- Do not apply LUNA EXPERIENCE within 14 days of harvest.
- To limit the potential for development of disease resistance to these fungicide classes, do not make more than 2 sequential applications of LUNA EXPERIENCE or any Group 7 or Group 3 containing fungicide before rotating with a fungicide from a different Group.

[1]Not for use in CA without a supplemental label.

Safe Pesticide Use

Liability

- The label is the law
- Home gardeners are liable for misuse of pesticides, including injury to:
  - People
  - Desirable plants
  - Environment
- Use particular caution around water

DIRECTIONS FOR USE
STOP - READ THE LABEL BEFORE USE
It is a violation of federal law to use this product in a manner inconsistent with its labeling.
Read entire label before using this product.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

ENVIRONMENTAL HAZARDS

For terrestrial uses: This pesticide is toxic to mammals, fish and aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment wash water or rinsate. This product may impact surface water quality due to runoff of rain water. This is especially true for poorly draining soils and soils with shallow ground water. This product is classified as having high potential for reaching surface water via runoff for several months or more after application. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of Fluopyram. Runoff of this product will be reduced by avoiding applications when rainfall or irrigation is expected to occur within 48 hours. Sound erosion control practices will reduce this product's potential to reach aquatic sediment via runoff.

(continued)

Safe Pesticide Use: Exposure Types

- Acute-Immediate toxicity due to a single exposure
  - Headache
  - Skin Rashes
  - Nausea
  - Muscle Weakness
- Chronic-long term exposure
  - Cancer
  - Reproductive disorders
  - Birth defects
  - Neurological disorders
  - Allergies

Pesticide Exposure: Pathways

- Skin (Dermal)-Most common – wash with soap and water before touching any other part of your body
- Mouth (Oral)-Usually takes place when one neglects to wash hands before eating and smoking
- Lungs (Respiratory)-Vapors and fine particles are easily absorbed by lungs and into bloodstream
- Eyes (Ocular)-often due to splashing

Levels of Exposure

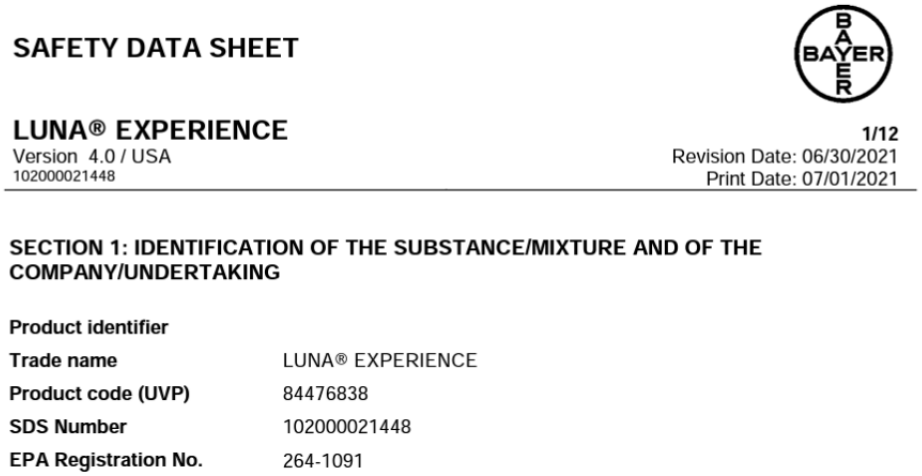
- **Mild:** Fatigue, headache, dizziness, blurred vision, excessive sweating/salivation, nausea/vomiting, stomach cramps, diarrhea
- **Moderate:** Weakness, chest discomfort, muscle twitches, constriction of pupils
- **Severe:** Unconsciousness, severe constriction of pupils, convulsions, secretions from mouth/nose, difficulty breathing

Basic First Aid

- Call 9-1-1 and/or Poison Control
- Wash skin contact with soap and water
- Get to fresh air
- Loosen tight clothing
- CPR
- Rinse eyes if ocular
- Vomiting? Read label first
- Provide physician with information

(Material) Safety Data Sheet

- How to clean up spills
- First aid measures
- Fire fighting measures
- Handling and storage
- Personal protection
- Other toxicological information (LD50)



SAFETY DATA SHEET

LUNA® EXPERIENCE
Version 4.0 / USA
102000021448

1/12
Revision Date: 06/30/2021
Print Date: 07/01/2021

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Trade name	LUNA® EXPERIENCE
Product code (UVP)	84476838
SDS Number	102000021448
EPA Registration No.	264-1091

Personal Protective Equipment
Basic Equipment

- Long sleeve shirt and long pan (always)
- Shoes and socks (always)
- Gloves (as per label)
- Eye/face protection (as per label)
- Respirator (as per label)
- Hat (as per label)
- Disposable protective clothin such as Tyvek (as per label)

Personal Protective Equipment
Cleaning Clothes

- Change clothing every day and change immediately if they becomes contaminated
- Store removed clothing in a plastic bag until it can be washed
- Wash clothes with maximum amount of detergent
- Presoak these clothes and wash separately from other clothes
- After washing clothes, run washer empty to clean
- Hang clothes outside to dry
- Store PPE separate from other clothing
- Dispose of clothes that receive significant exposure

Application Equipment

- Proportioner (hose-end sprayer)
  - Not recommended for most situations
- Compressed Air Sprayer
  - Best choice for small jobs
- Check-valve for chemigation

Pesticide Storage

- Purchase only what you need immediately so you don’t have to store
- Store in locked, (preferably ventilated) area
- Mix only the amount of pesticide that you need immediately
- Keep label nearby and intact
- Triple-rinse empty containers
- Never use old containers for other purposes

Major Points Revisited

- Not all organisms that damage plants need be controlled
- Identify thresholds to determine when to begin pesticide application
- Identification of the pest organism is crucial to effective control
- When applying a pesticide, **always** read the label Buy pesticides in appropriate sized containers to avoid having to store them for long periods
- When in doubt, contact your local Cooperative Extension Office