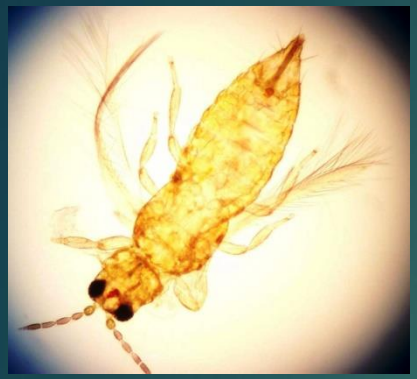


Pest Control Basics & Garden Chemical Safety

DEEP SOUTH DISTRICT

CONSULTING ROSARIAN CLASS 2017

Integrated Pest Management

ARS CONSULTING ROSARIAN MANUAL

CHAPTER 7

Note: This section lays out the basics of how a CR approaches a Problem! Use this material to frame the work you do!

Integrated Pest Management

- A Decision Process
  - **Determines by observation & biological controls, if & when treatment is needed in a way least disruptive to the environment**
  - Decision includes:
    - Biological Control
    - Physical Control
    - Habitat Observation
    - Least toxic chemical required for control

The 4 Elements of IPM

- The 4 Elements
  - Decision **whether** to treat (Prevention or Elimination)
  - Decision **when** to treat
  - Decision **how** to treat
  - Evaluation & review of the decisions

Treatment Consequences

- The 3 R and an S
  - Pesticide Residue **(MTR)**
    - Where does it go? (neighbors, your house)
    - Who else might run across the applied chemicals
    - Active life of the chemical
    - Does it get to ground water?
  - Pest Resistance to Pesticides
    - Black Spot requires varying the chemicals by **MODE OF ACTION (MOA)**

Treatment Consequences

- Pest Resurgence
  - How soon will they come back?
  - Pesticides kill bad guys and good guys
    (? Balance)
  - Pests rebuild faster than the beneficials
  - May see pest buildup within a few weeks
  - Observation modifies your spray program
- Secondary Pest Outbreaks
  - When one pest is killed and some beneficials also are killed, other forms of pests may now be able to attack.
  - E.g. Thrips* vs. Spider Mites

  * Using Broad Spectrum Pesticides

Modes of Action

- BT (Bacillus thuringiensis) - Stomach poisons
- Pheromones - Disrupt Mating
- Pheromone attractants – Trapping Insects
- Insect Growth regulators – Interupt metamorphosis
- Botanical Pesticides - plant derived (Neem)
- Insecticidal soaps - Break pests outer covering
- Selective Pesticides - focused on limited pests
- Broad spectrum - Kills everything (good & bad)

Pesticides & Garden Safety

ARS CONSULTING ROSARIAN HANDBOOK

CHAPTER 8

Garden Chemicals

- Three Don'ts
  - Never make a recommendation for a garden chemical beyond those uses listed on the label
  - Never recommend the use of restricted chemicals
  - Never share chemicals
    - All containers must have the original label affixed
    - The US Environmental Protection Agency Sets standards for both pesticide handling and use

Definition

A pesticide is ANY chemical that is used by man to control pests

Therefore pesticides can be:

Biocides

Insecticides

Fungicides

Herbicides (Kills weeds)

Miticides

Molluscicide

Nematicide (Kills Nematodes)

Ovicide (Kills eggs of insects and mites)

Insecticides

MOA (Mode of Action)

- Stomach (Lethal ingestion)
- Contact (Kills on Contact)
- Residual (Long Term Toxic)
- Fumigant (Inhale lethal doses)
- Repellent (Distasteful)
- Systemic (kills on plant ingestion)

Different Insecticides attack in different ways

Rotation avoids resistance problems

Fungicides

- Mode of Action (MOA)

- Protectants — Applied before infection of fungus

- Eradicant — Kills on contact after infection occurs
- Systemic — Translocated by leaves & roots to prevent infection

Pesticide Toxicity

- "How Poisonous"
- Lethal Dose LD50
  - The lethal dose to kill 50% of the study population
  - **The LOWER the dose required to reach LD50,the more toxic**
- LD 50 expressed in milligrams (mg) of material per kilogram
- Book Example: LD 50 of Orthene = 945mg/Kg
  A 150# man = 68Kg.

68Kg x 945 mg/Kg = 64,260mg or 64.26 g

This is equal to about ¼ cup

Toxicity of Pesticides

Probable Lethal Dose (LD50 in mg/Kg)

Category1	Signal Word	Oral	Dermal	Oral Dose for 150 # Man
I Danger POISON	Danger Poison 	1 tsp	0-200	Drops to 1 tsp
I Danger	Highly Hazardous	Pesticide Specific	Pesticide Specific	SEE LABEL!!
II Warning	Warning	>50 to 500	>200 to 2K	1 tsp to 1 oz
III Slightly Toxic	Caution	Over 500	>2K to20K	< 1 pint
IV Caution	Caution	Low toxicity	Low toxicity	Over a pint

How Pesticides Enter The Body

1. **Oral** May be taken in error
2. **Dermal** **Absorbed through the skin**
   ESPECIALLY with concentrated materials
3. **Inhalation** Of dust, spray mist or fumes
   Be extremely careful when mixing powders
   e.g. Dithane M45
4. **Ocular** through the eyes

The Dermal and Inhaled forms are the most dangerous!!

Get a TETNUS Shot as you become a rosarian and every 10 years there after !!

Spray Attire Checklist

- Cover as much of your body as is possible
- ALWAYS wear at least:
  - Goggles
  - Long sleeved shirt/full length pants*
  - Rubber Gloves

    (Gauntlet are the best– No cotton or leather)
  - Closed toe shoes (I have a set just for spraying)
  - Respirator (#1 protection for inhalation)
  - Hat (especially when spraying above your head)
  - ALWAYS wash hands & face, then shower when finished

* Establish one set of clothing for spraying –

  change after spray or **use a spray suit** ---

Proper Spray Attire

NOTICE: There is nothing that drives a new rosarian away faster than seeing this getup!! Consider minimal complexity in talks to new rosarians.

Also the neighbors wonder how lethal the LD50 is?

Jeff Hoffman is sort of casual but well covered, too!

Proper Precautions

- Plan ahead
  - First check weather – no wind/rain/snow
  - Second check for moisture on the leaves
  - Check Sprayer & hoses to assure no leaks
- Mixing
  - Put on spray gear before starting to mix
    - Gloves are a must!!! (2 levels)
  - Work in a **well ventilated** area
  - Avoid splashes and mix just enough for this round
- Cleanup carefully

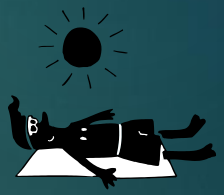
Proper Precautions

- Always keep chemicals in original container
- Make sure label is attached
- Cover dishes, plastic pools, sand boxes to protect children and pets

- Store chemicals in a closed dark location
  Away from child access – MARK THE DOOR
- Note: In Florida it is often a good idea to store in a dorm room type mini refrigerator

Pesticide Use Tips

- READ THE LABEL
- Use the dose recommended on the 
- Label will usually tell if chemical can be mixed with other chemicals **e.g. Never Miticides**
- Never spray in strong sun or above 80°
- Never use oils when temperature 80° +
- Watch the Wind – Work upstream
- Water before spraying
- Spreader stickers ok to add Spray both undersides and tops of leaves
- Do not use restricted pesticides, requires license
- Use absorbent materials to clean spilled pesticide



Botanical & Mineral Pesticides

	Oral LD50 =
Rotenone- DANGER General Purpose Insecticide	132-1500
Pyrethrum- DANGER General Purpose Insecticide	75
Diatomaceous Earth- Microscopic Daggers	22,500
Sabadilla-dust or spray for hard shell insects	500-5,000
Ryania-stomach poison Very Toxic to Dogs (IPM)	1.2g
Bio Neem -Neem tree seed inhibits desire to feed	5,000-Skin 50+
Sulfur-Old fungus remedy (dust or liquid) use w/lime	
Copper-Controls leaf spots, rust, downey mildew, anthracnose & scale 7% $CuSO_4$	300

The point here is that seemingly harmless materials can carry low LD50

Mi+cides
Used to control mites & ticks

Photo: Jeff Hoffman

Non Toxic Alternatives

- Safer Soap/Insecticidal Soap
- Sunspray Oil
- Neem Oil
- Beneficial Insects
- Anti-Transpirants

There is no LD50 issue here!

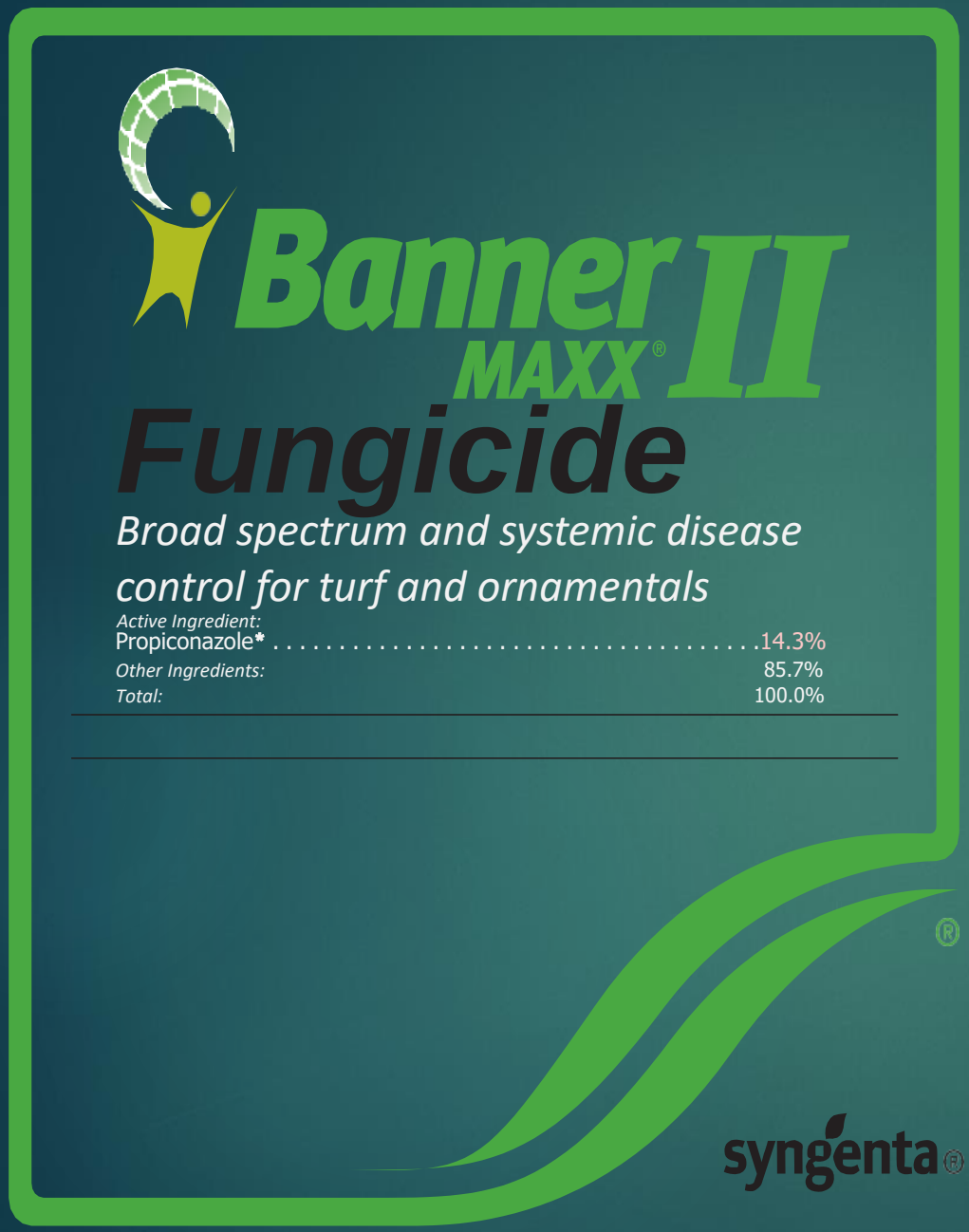
<< Bacillus amioliquefaciens strain D747 98.85%

Pulling it all Together – An Example in Fungicide

MOA G (Blocks cellular growth in membranes)

FRAC Group: DMI fungicides (DeMethylation Inhibitors)

Chemical Group	Product	EPA Flag	Agent
Piperazines	Funginex	1 DANGER	Triflorine 18.2%
	Ortho Rose Pride Rose & Shrub Control	1 DANGER	Triflorine 6.5%
Triazoles	Eagle 20 EW	3 Caution	Myclobutinil 19%
	Immunox	3 Caution	Myclobutinil 1.55%
	Banner Maxx	3 Caution	Propiconazole 12.3% (2/3 tsp/14 days)
	Fertilome Liquid Systemic Fungicide	2 WARNING	Propiconazole 1.55% (2TBSP/7Days)



Eagle 20 EW

Specimen Label

A systemic, protectant and curative fungicide for disease control in established turfgrass, landscape ornamentals, greenhouse and nursery ornamentals, apples, stone fruits and grapes

Group 3 FUNGICIDE

Active Ingredient

myclobutanil: a-butyl-a-(chlorophenyl)-1H-1,2,4,triazole-1-propanenitrile **19.7%**

Other Ingredients 80.3%

Hazards to Humans and Domestic Animals

Fungicide Types

- Two different classes or types-
  - **Broad Spectrum, Multi Site surface protectants**

    (no leaf entry)
    - MOA enables them to act against a broad list of fungal diseases
    - And allows them to act at multiple sites
    - Sometimes called "contact fungicides"
    - No use against EXISTING blackspot, protects against virus spread
    - Examples – Daconil, Mancozeb, Dithane M45

Fungicide Types

- **Single site, mostly locally systemic – enter the leaf**

  It is NOT translocated upward to new growth

  - Penetration requires a wet leaf
  - Examples-
    - Sterol Inhibitors--Funginex, Bayleton, Rubigan,
    - Propiconazole – Banner Maxx, Honor Guard
    - Myclobutanil- Systhane, Immunox

- The issue here is resistance buildup, thus switch MOA frequently

Good Luck on Your CR Exam or if You Are Already a CR, Try A Little IPM Thinking as You Respond to Your Members!

CLASS COMPONENTS DEVELOPED OVER TIME BY:

*JOHN & MITCHIE MOE * JEFF HOFFMAN

*WALT REED * PHIL PAUL

THIS PRESENTATION IS ON THE DSD WEBSITE

IN THE CONSULTING ROSARIAN CLASS TAB