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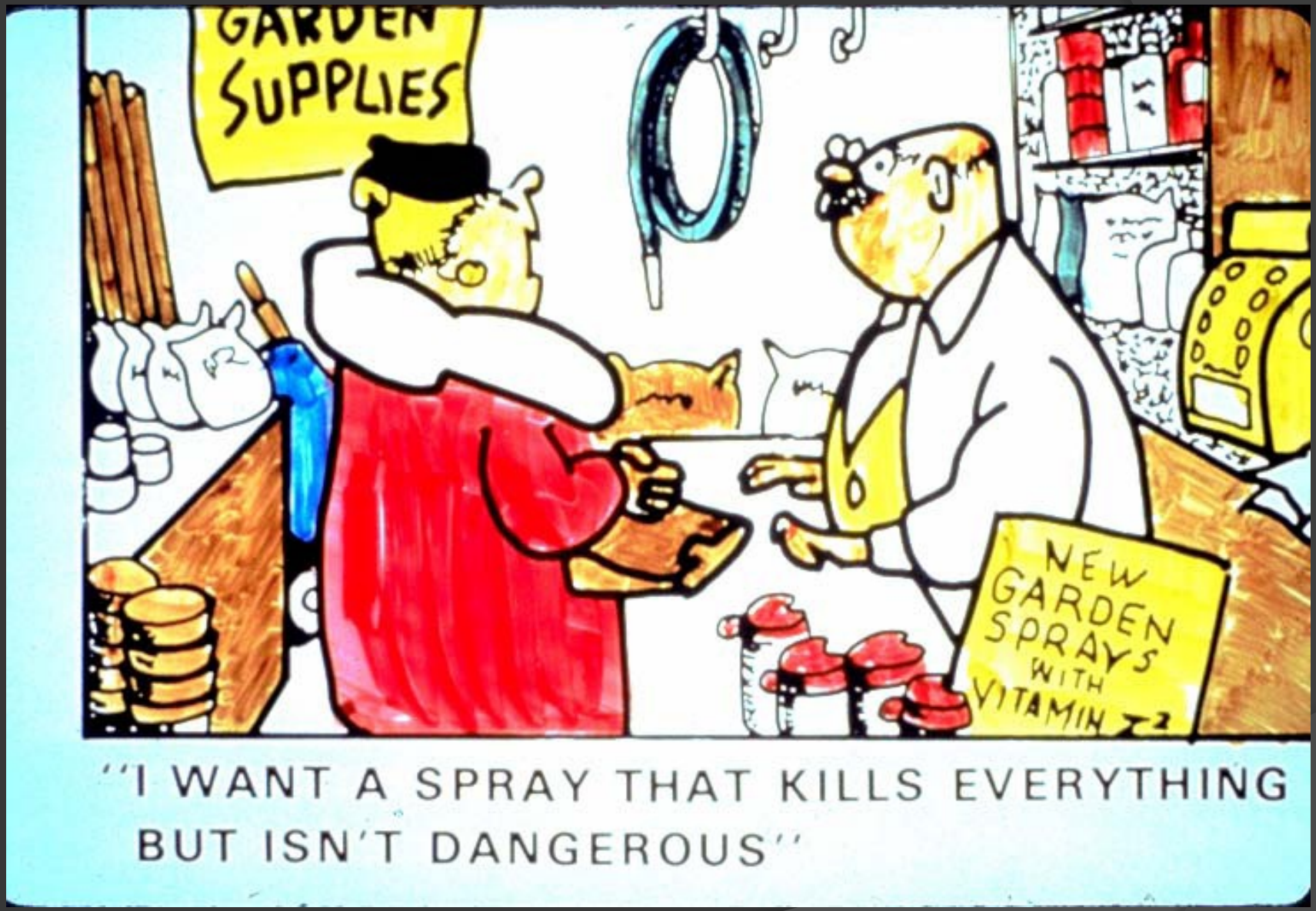
September 2015

PESTICIDE FORMULATIONS


GARDEN SUPPLIES
NEW GARDEN SPRAYS WITH VITAMIN Z
"I WANT A SPRAY THAT KILLS EVERYTHING BUT ISN'T DANGEROUS"

B.
C.


I REFUSE TO PUT CHEMICALS ON MY FRUIT TREES!
GOOD GIRL.
THE BUG MAN
WHAT'S MY NEXT BEST BET?
DEVELOP A TASTE FOR WORMS.
THE BUG MAN
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Objectives

- Define Pesticide Formulation
- Define the different formulations
- Discuss the pros and cons of each formulation

Important Definitions

- **Active Ingredient (Ai)** - the actual chemical in the product mixture that controls the pest
- **Inert Ingredient** - other materials added with the AI when the product is formulated
- **Phytotoxicity** - plant damage
- **Adjuvant** - product added to spray tank to assist pesticide in its application

What is a pesticide formulation?

- Pesticides are rarely applied in the technical form.
- Made up of two parts -
    a. Active ingredients - what controls the pest
    b. Inert ingredients - filler material to spread out the active ingredient. Make it safer, more effective, easier to measure & use

Dry Formulations

Dusts (D)

- Finely ground, ready to use substance
- 0.5 - 10% Active Ingredient
- Must always be kept dry
- Potentially irritating to user
- No mixing, easy application
- Drift is a problem (no herbicides)
- Wind and rain can remove it quickly
- Expensive for amount of AI

Baits (B)

- AI mixed with food or something that will attract pest.
- Usually used for insects or rodents
- May be attractive to non-target pests
- Dead pests may stink
- Cost high if repeated baiting needed
- AI <5%

Granules (G)

- 2 - 40% AI, applied to porous, solid material (clay, corn cobs, walnut shells)
- Applied as a liquid and absorbed
- Used to control pests in soil
- AI absorbed by plant roots
- Little dust or drift hazard
- Need incorporation
- May be eaten by non target animals
- May get trapped in some plants
- Never mix with water
- Expensive

Pellets (P)

- Similar to Granules
- 10 - 20% AI + small inert carrier
- Usually extruded 1/8” to ½”
- Applied to soil – near desired plant
- Little dust or drift hazard
- May be eaten by non target animals
- Expensive

Wettable Powders (WP W)

- Finely ground, dry formulation
- 5 - 95 % Active ingredient (usually >50%)
- Forms a suspension when mixed with water
  - Suspension—does not dissolve, requires constant agitation
- Abrasive to pumps
- Inhalation is potential problem
- Relatively inexpensive
- Generally safe on tender foliage
- Easy to measure

Soluble Powders (SP WSP)

- 15 -95% AI (usually >50%)
- Dissolves in water to form true solution
- No extra mixing required (check)
- Inhalation is potential problem
- Relatively inexpensive
- Generally safe on tender foliage
- Easy to measure

Water Dispersible Granules (WDG) & Dry Flowables (DF)

- 75 – 90% AI
- Like WP's, except in granular form
- Granules break apart when they hit water
- Requires constant agitation
- Less dust than WP's (EPA friendly)
- More easily measured and mixed than WP's
- Slightly more expensive than WP's

Liquid Formulations

Flowables (F FS SC)

- Very fine powder in suspension of a liquid carrier
- Generally mixed with water
- High concentration of AI – 4 lbs/gallon of active ingredient
- Same cons as WP's (except dust)
- Must shake containers
- Easy to handle
- Reduce clog nozzles

Emulsifiable Concentrates (EC)

- Liquid formulation
- Active ingredient dissolved in petroleum based solvent
- Emulsifier added so that oil can disperse in water
- Milky when added to water
- 2-8 lbs. active ingredient/g

- Relatively inexpensive
- Easy to handle
- Requires little agitation
- Non abrasive
- Does not plug nozzles
- Potential health problem (dermal)
- Potentially phytotoxic
- Equipment harder to clean

Solutions (S)

- Dissolve in a liquid solvent - premixed
- Will not settle out
- Used in sprayers, indoors & outdoors
- Also called Ready-to-Use (RTU)
- Small percentage AI (< 1%)

Ultra Low Volume (ULV)

- 80 - 100% AI
- Ready to use (or with very small amt water)
- Phytotoxic hazard
- Limited uses - outdoor

Aerosols

- AI in dissolved in a solvent in a pressurized container
- Easy to use and store
- Low percentage AI
- High cost
- Inhalation injury possible
- Drift a problem
- Flammable!

“Look at my wall! Can’t you tell the difference between bug killer and spray-paint?”

Fumigants

- AI is either gas or liquid but becomes a gas when applied
- Used in soil and closed structures
- Toxic to wide range of pests
  - Penetrates cracks
  - One treatment enough
  - Must enclose area


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