PESTICIDES

Safety
Handling
Application

OKBFRP Horticulture Program
July 2012

What are Pesticides?

- Pesticides are chemicals that kill pests.
- Pests are destructive or otherwise problem living organisms and "cide" means to kill.
- Therefore, the following are all pesticides:
  - Herbicides, which kill plants
  - Insecticides, which kill insects
  - Fungicides, which kill fungi
  - Bactericides, which kill bacteria
  - Piscicides, which kill fish
  - Rodenticides, which kill rodents

Dead Beetle

Allowed Pesticides

- **Naturals (nonsynthetics)**
  - minerals (diatomaceous earth, baking soda)
  - biologicals (*Bt, B. bassiana,* spinosad)
  - botanicals (rotenone, neem, pyrethrum, garlic, oils)
- **Synthetics (on the National List only)**
  - processed minerals (sulfur, copper)
  - soaps (insecticidal, herbicidal)
  - horticultural oils (narrow range, superior, stylet)
  - commercial pheromones

RESCUE CHEMISTRY*

Whether organically acceptable or not, consider pesticides as

“Rescue Chemistry.”

Don’t design your system to depend on them

* Term ostensibly coined by the late Chuck Walters, editor of Acres U.S.A. For details , see: http://www.acresusa.com/magazines/magazine.htm

Pesticide Treadmill

A

Secondary Pest Problems

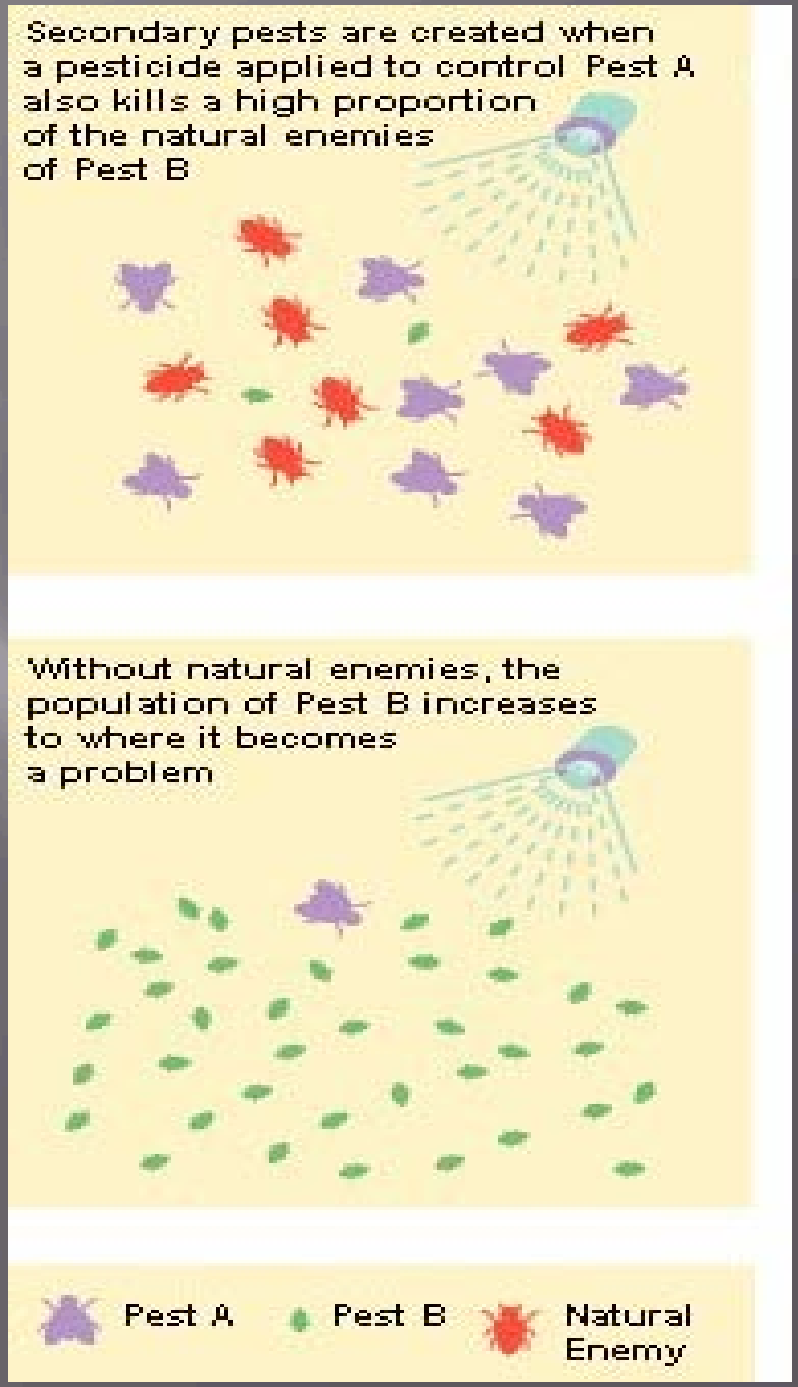

Figure from: *Best Management Practices: Horticultural Crops, http://www.gov.on.ca/OMAFRA/english/environment/hort/basics3.htm*

Pesticide Treadmill B Resistance

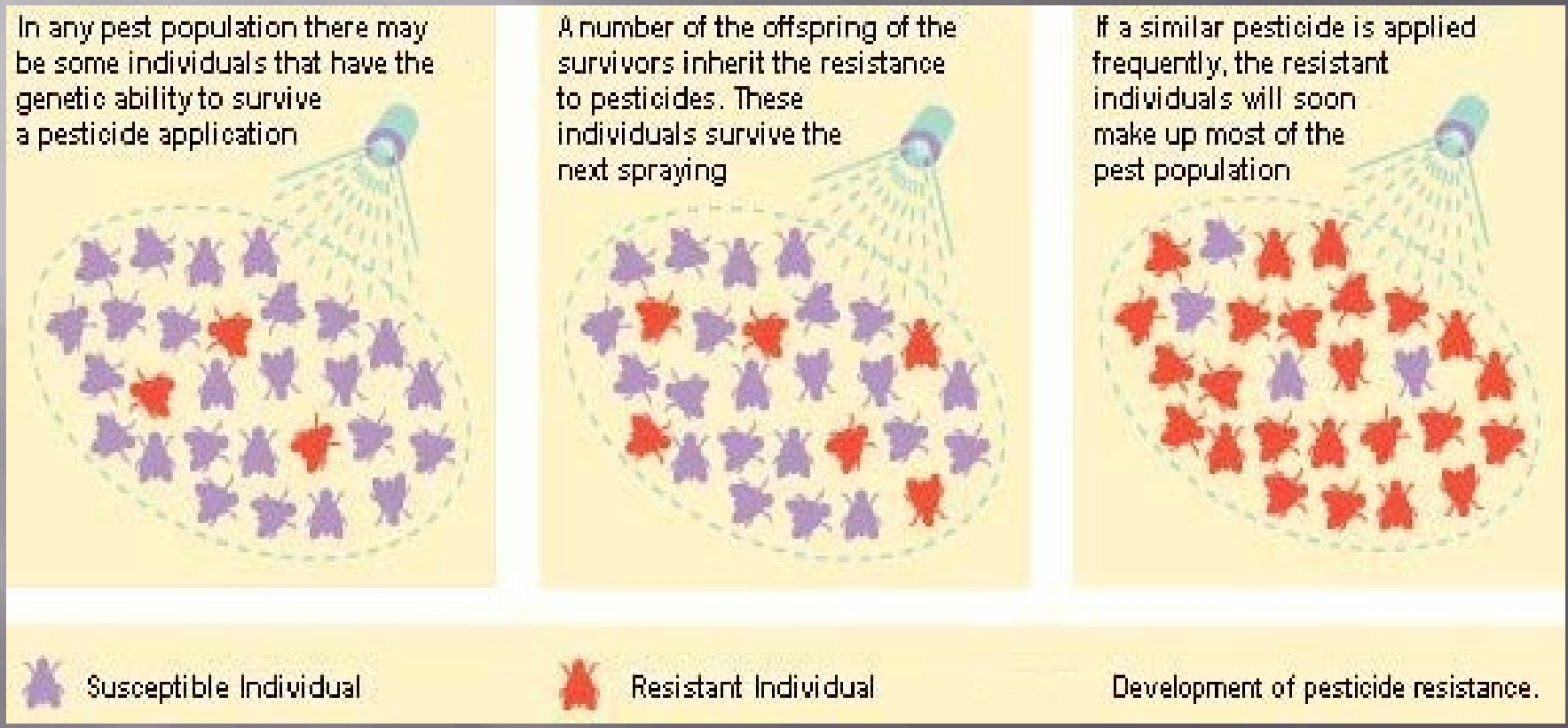

Figure from: *Best Management Practices: Horticultural Crops, http://www.gov.on.ca/OMAFRA/english/environment/hort/basics3.htm*

Disclaimer

- If you are planning to spray large acreages, handle & store large amounts of pesticides, sell pesticides to others, or do custom application work, you need much more background than we will give you in this class.

- See your local Cooperative Extension Agent for guidance.

Simply because it's organic or "natural"…

- …doesn't mean it's safe. Botanical-based pesticides can be especially hazardous.

- Nicotine, cryolite, arsenic, and strychnine are specifically prohibited from use.

Pesticides: General vs. Restricted Use

- 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

  -Classified by the EPA because they can cause harm to human health or the environment even when applied according to the label

  -Training and testing are required to purchase and apply restricted use pesticides (i.e. Certified Applicators).

Pesticide Labeling

- Brand, chemical, and common names
- Formulation, ingredients and contents
- Signal Words*
- Directions for use
  - Pests controlled
  - Crops safe for use
  - Application rates
  - Conditions & phytotoxicity
  - Compatibilities/mixing requirements
- Storage and disposal information
- Safety Information*
- Environmental Hazards
- First aid information
- Manufacturer info. & EPA Registration

Signal Words

Signal Word	Toxicity	Human Lethal Dosage	Symbol
CAUTION	Low	Ounce to a pint	None
WARNING	Moderate	Teaspoon to one ounce	None
DANGER	High	A few drops to a teaspoon	Skull and crossbones; POISON

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Personal Protective Equipment (PPE)
Basic Requirements for Organic Pesticides

- **Read Label First!!!**
- **Always Required:**
  - **Long sleeve shirt and long pants**
  - **Shoes & socks (Impervious Boots are best)**
  - **Eye protection**
  - **Gloves (nitrile, latex, etc.)**
- **Often advisable**
  - **Respirator**
  - **Hat**
  - **Apron (when mixing)**
- **Wash PPE separate from family laundry**

Material Safety Data Sheet

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

Pesticide Exposure

- **Dermal:** Most common. Immediately wash with soap and water. Prevent by choosing good mixing location and wearing suitable PPE.
- **Oral:** Usually takes place when one neglects to wash hands before eating and smoking. Prevent by NOT DOING THAT!!!!!
- **Respiratory:** Vapors and fine particles are easily absorbed by lungs and into bloodstream. Mixing location should be well aerated. Wear mask when appropriate.
- **Eye Exposure:** Eyes rapidly absorb chemicals. ALWAYS wear eye protection. Mix chemicals well below eye level.

POISONING EMERGENCY?

Call 911

For a poison emergency in the U.S. call 1-800-222-1222

American Association of Poison Control Centers

Application Equipment

- **Proportioner /Hose-end Sprayer**
  - Not recommended for most situations

- **Compressed Air Sprayer (Includes Backpacks)**
  - Best choice for small jobs

- **Duster**
  - Old fashioned, not accurate but works for some materials

Surfactants, Additives, Adjuvants

- Reduces surface tension between surfaces, keeps materials in suspension, improves coverage
- Very few surfactants are allowed in organic production. (Dish soaps are prohibited) Some that are:
  - Humic acid extracts. Increase cell permeability and penetration of spray, e.g. Humax®
  - Spreader/Stickers: e.g. Nu-Film P®, Therm X70®

Storage and Disposal

- **Proper storage is important**

  -store in original container with label

  -storage area should be secure from children

  -store biologicals in cool, dark places. Renew annually??

- **Disposal**

  -Label indicates proper disposal methods

  -Some cities have collection days for hazardous materials.

  -ODAFF sponsors Unwanted Pesticide Disposal Program for farm chemicals.

Important Points

- Establish a sound organic system, backed up by good cultural practices to reduce pest problems
- Be certain you have a real problem before resorting to pesticides. Not all organisms that damage plants need to be controlled.
- Proper identification of the pest organism is crucial.
- When applying a pesticide, always read the label before buying, before mixing, before application, after application (for cleanup)
- Buy pesticides in appropriate sized containers to avoid having to store them for long periods
- When in doubt, contact your local Cooperative Extension Office.