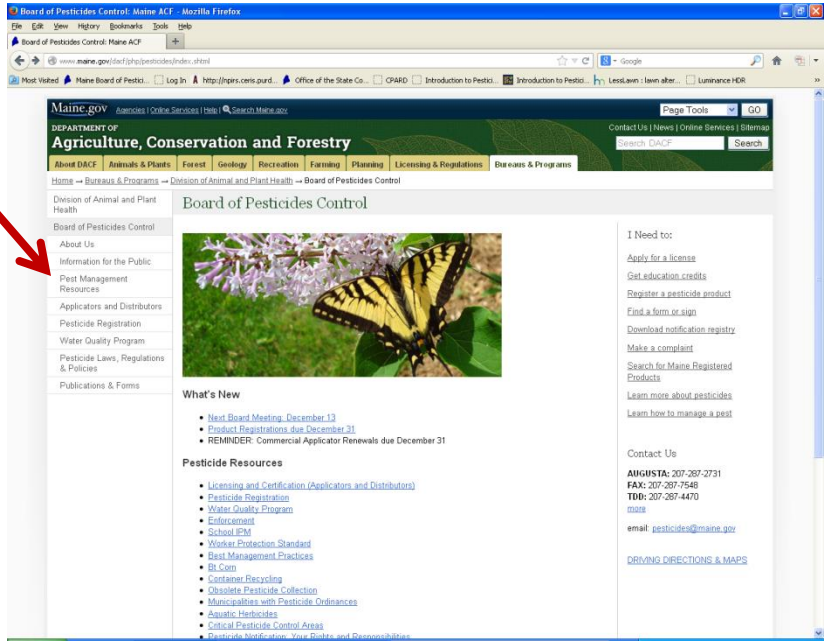
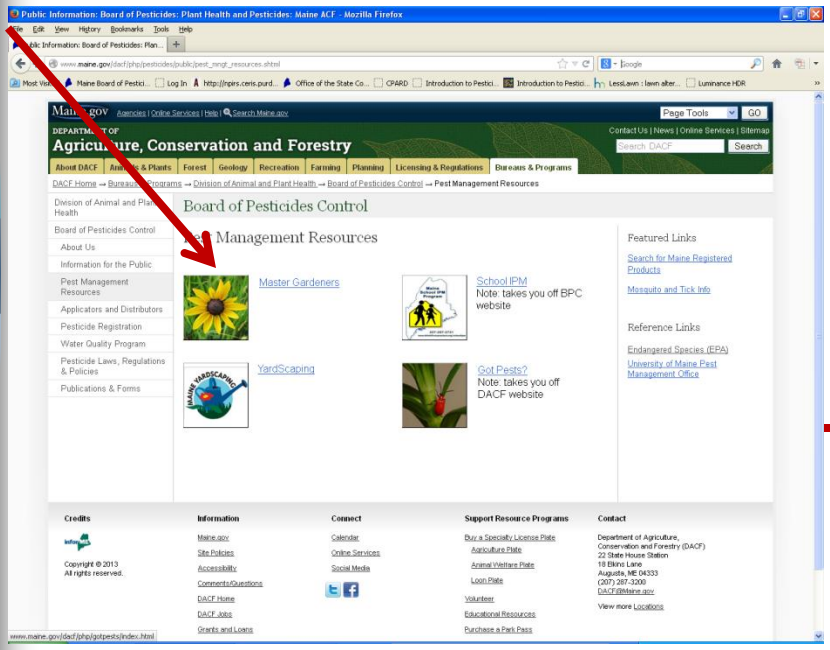
Home Pesticide Use

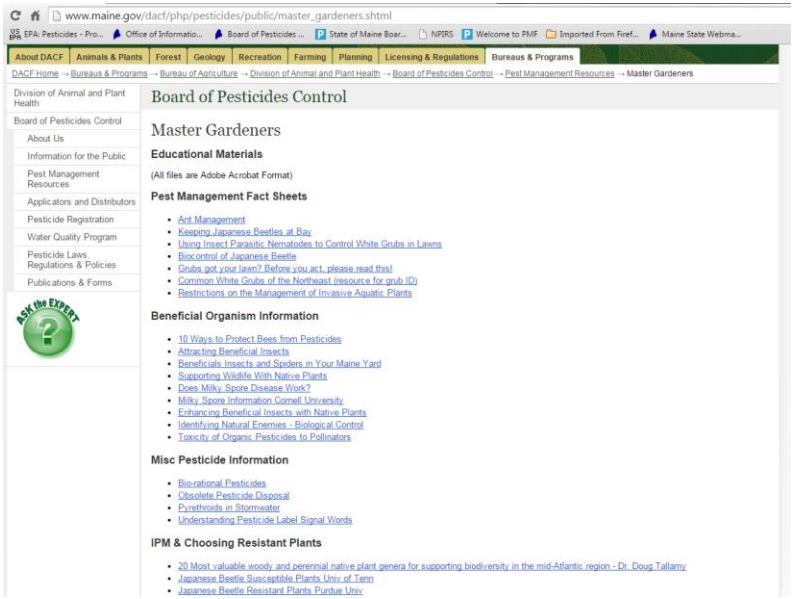
Risks & Benefits

- Megan Patterson
  Maine Board of Pesticides Control
  28 State House Station
  Augusta ME 04333-0028
  (207)287-2731
  megan.l.patterson@maine.gov

Handouts on-line

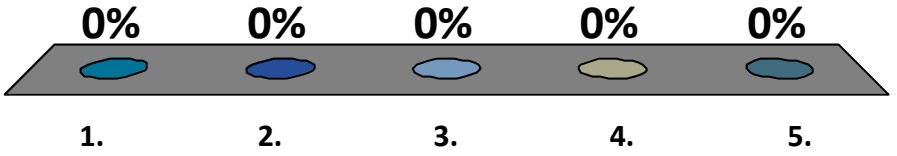






Which type of gardener are you?

1. Black thumb
2. Novice
3. Intermediate
4. Experienced
5. Greenest thumb

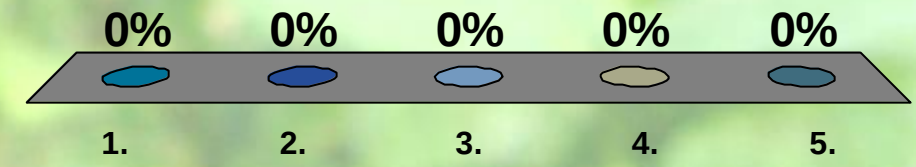


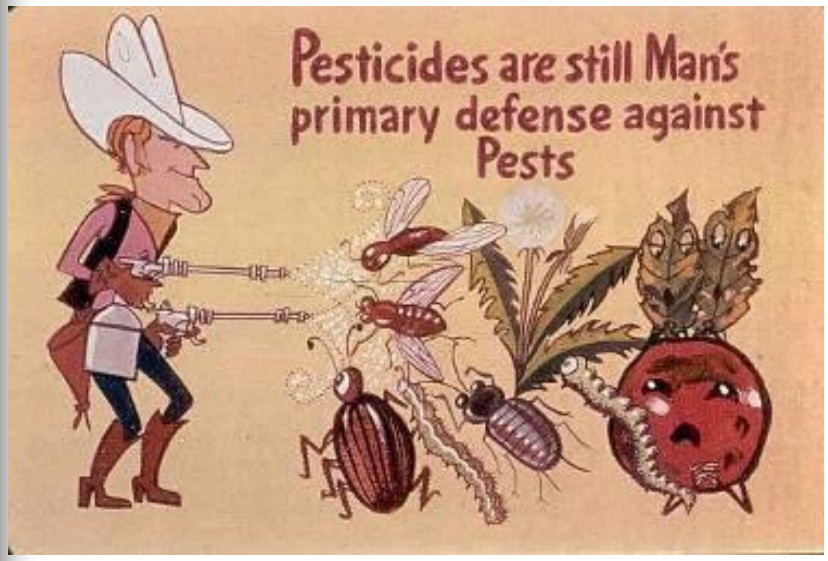
Have you ever heard of the Board of Pesticides Control (BPC)?

1. Yes
2. No

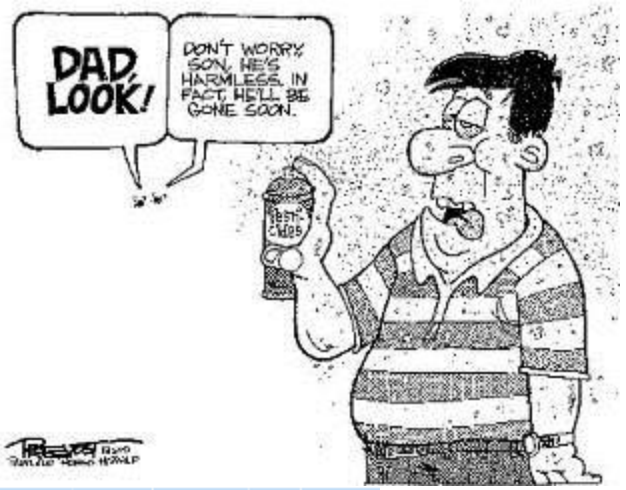
What is your opinion of the BPC?

1. Strongly favorable
2. Favorable
3. Neutral
4. Unfavorable
5. Strongly unfavorable





How we see ourselves using pesticides



Unfortunately, a not so uncommon result from our use of pesticides


boston.com

Local Search Site Search GO

HOME | TODAY'S GLOBE | NEWS | BUSINESS | SPORTS | LIFESTYLE | A&E | THINGS TO

Local | National | World | Politics | Business | Education | Health | Science | Green

HOME / NEWS / NATION

Bug spray likely killed infant, injured 2 in SC

Associated Press

By Seanna Adcox
Associated Press Writer / November 2, 2009

E-mail | Print | Yahoo! Buzz | ShareThis Text size

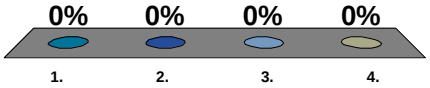
COLUMBIA, S.C.—Bug spray that produces a fog to kill insects is likely to blame for the death of a 10-month-old South Carolina boy, and his 2-year-old brother was critically injured by the fumes, authorities said Monday.

We've relied on pesticides in the past and still rely on them today

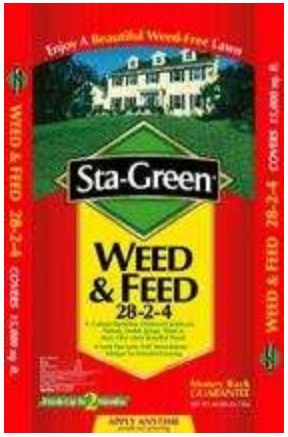
Which are pesticides?

1. A.
2. B.
3. C.
4. D.

No endorsement intended or implied



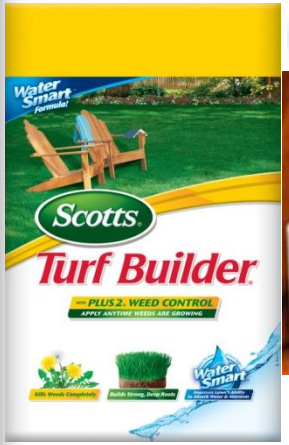
Maine pesticide use more common than perceived



No endorsement intended or implied

What are pesticides?

- Bleaches, *Lysol*, pine oil



- Weed & Feed, *Roundup*

- Rat & mouse baits

- Plant disease controls

No endorsement intended or implied

What are Pesticides?

- Sevin, Pyrethroids, *Raid*
- "Organics" like pyrethrum
- Biological Controls

- Wood preservatives

No endorsement intended or implied

These are Pesticides?

- Plant incorporated protectants
  - Have the *Bt*. Crystalline protein engineered into them

No endorsement intended or implied

EPA exempt pesticides

- Some pesticides have been deregulated by EPA
  - Exempt from Federal registration
  - Must be registered by State of Maine
  - Exempt from toxicity testing
  - NOT risk free

Ingredients in some of these products:

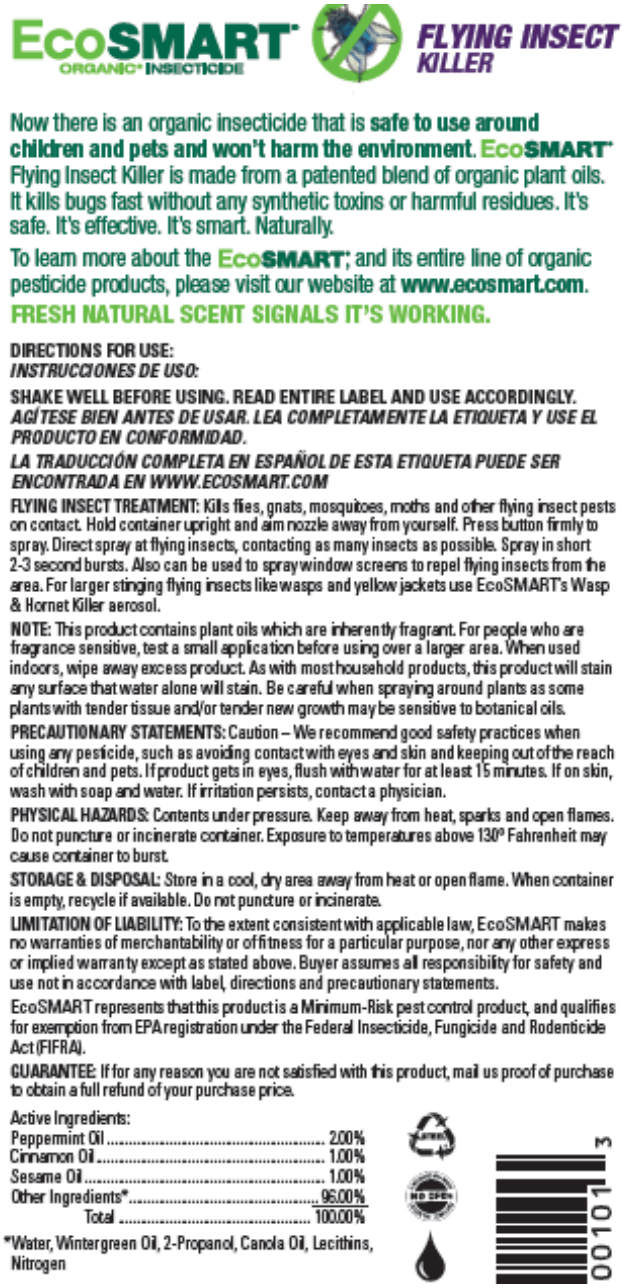
- Rosemary oil
- Peppermint oil
- Thyme oil
- Clove oil
- Wintergreen oil
- Cinnamon oil

No endorsement intended or implied

What are the risks?

- **Peppermint oil –**
  - highly toxic,
  - use in infants or children is not recommended, when inhaled, due to the potential toxicity of the product
  - doses of menthol over 1 g/Kg body weight may be deadly
  - causes dermatitis,
- **Cinnamon oil –**
  - powerful irritant and
  - even worse sensitizer
  - cinnamon contains coumarin, the parent compound of warfarin, a medication used to keep blood from clotting

http://www.naha.org/ https://nccih.nih.gov/health/cinnamon



EcoSMART ORGANIC* INSECTICIDE FLYING INSECT KILLER

Now there is an organic insecticide that is **safe to use around children and pets and won't harm the environment.** EcoSMART Flying Insect Killer is made from a patented blend of organic plant oils. It kills bugs fast without any synthetic toxins or harmful residues. It's safe. It's effective. It's smart. Naturally.

To learn more about the EcoSMART; and its entire line of organic pesticide products, please visit our website at **www.ecosmart.com.**

FRESH NATURAL SCENT SIGNALS IT'S WORKING.

DIRECTIONS FOR USE:
INSTRUCCIONES DE USO:

SHAKE WELL BEFORE USING. READ ENTIRE LABEL AND USE ACCORDINGLY.
AGÍTESE BIEN ANTES DE USAR. LEA COMPLETAMENTE LA ETIQUETA Y USE EL PRODUCTO EN CONFORMIDAD.

LA TRADUCCIÓN COMPLETA EN ESPAÑOL DE ESTA ETIQUETA PUEDE SER ENCONTRADA EN WWW.ECOSMART.COM

FLYING INSECT TREATMENT: Kills flies, gnats, mosquitoes, moths and other flying insect pests on contact. Hold container upright and aim nozzle away from yourself. Press button firmly to spray. Direct spray at flying insects, contacting as many insects as possible. Spray in short 2-3 second bursts. Also can be used to spray window screens to repel flying insects from the area. For larger stinging flying insects like wasps and yellow jackets use EcoSMART's Wasp & Hornet Killer aerosol.

NOTE: This product contains plant oils which are inherently fragrant. For people who are fragrance sensitive, test a small application before using over a larger area. When used indoors, wipe away excess product. As with most household products, this product will stain any surface that water alone will stain. Be careful when spraying around plants as some plants with tender tissue and/or tender new growth may be sensitive to botanical oils.

PRECAUTIONARY STATEMENTS: Caution – We recommend good safety practices when using any pesticide, such as avoiding contact with eyes and skin and keeping out of the reach of children and pets. If product gets in eyes, flush with water for at least 15 minutes. If on skin, wash with soap and water. If irritation persists, contact a physician.

PHYSICAL HAZARDS: Contents under pressure. Keep away from heat, sparks and open flames. Do not puncture or incinerate container. Exposure to temperatures above 130° Fahrenheit may cause container to burst.

STORAGE & DISPOSAL: Store in a cool, dry area away from heat or open flame. When container is empty, recycle if available. Do not puncture or incinerate.

LIMITATION OF LIABILITY: To the extent consistent with applicable law, EcoSMART makes no warranties of merchantability or of fitness for a particular purpose, nor any other express or implied warranty except as stated above. Buyer assumes all responsibility for safety and use not in accordance with label, directions and precautionary statements.

EcoSMART represents that this product is a Minimum-Risk pest control product, and qualifies for exemption from EPA registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

GUARANTEE: If for any reason you are not satisfied with this product, mail us proof of purchase to obtain a full refund of your purchase price.

Active Ingredients:	
Peppermint Oil	2.00%
Cinnamon Oil	1.00%
Sesame Oil	1.00%
Other Ingredients*	96.00%
Total	100.00%

*Water, Wintergreen Oil, 2-Propanol, Canola Oil, Lecithins, Nitrogen

No endorsement intended or implied

Caveat emptor!

For Release: 09/10/2012

FTC Takes Action Against Companies Marketing Allegedly Unproven Natural Bed Bug and Head Lice Treatments

Cedar, Cinnamon, Lemon Grass, Peppermint, and Clove Oil? There's No Proof They Will Eradicate Bed Bugs, Agency Says

The Federal Trade Commission filed deceptive advertising charges against two marketers of remedies for bed bug infestations, who allegedly failed to back up overhyped claims that they could prevent and eliminate infestations using natural ingredients, such as cinnamon and cedar oil. One marketer also allegedly made misleading claims that its products were effective against head lice.

In one of the two cases, RMB Group, LLC and its principals have agreed to settle the charges relating to their "Rest Easy" bed bug products. In the case against Cedarcide Industries, Inc. and others, challenging their marketing of "Best Yet!" bed bug and head lice treatments, the defendants have not settled, and the FTC is beginning litigation against them.

What about home remedies

- Home chemistry is not recommended by the BPC
- Many of the materials used seem “safe” because we eat them or use them on our skin
- Exposure routes may be different
- What we eat may not be safe to breathe

Example

GLOBAL HEALING CENTER
Natural Health & Organic Living

6. Eucalyptus oil
A great natural pesticide for flies, bees and wasps. Simply sprinkle a few drops of eucalyptus oil where the insects are found. They will all be gone before you know it

From Medline Plus – NLM NIH

http://www.nlm.nih.gov/medlineplus/druginfo/natural/700.html

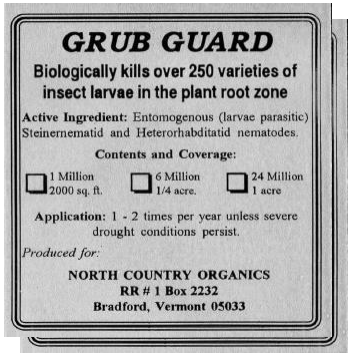
- Eucalyptus oil is **POSSIBLY UNSAFE** when applied directly to the skin without first being diluted. Eucalyptus oil is **LIKELY UNSAFE** when it is taken by mouth without first being diluted. Taking 3.5 mL of undiluted oil can be fatal. Signs of eucalyptus poisoning might include stomach pain and burning, dizziness, muscle weakness, small eye pupils, feelings of suffocation, and some others. Eucalyptus oil can also cause nausea, vomiting, and diarrhea.

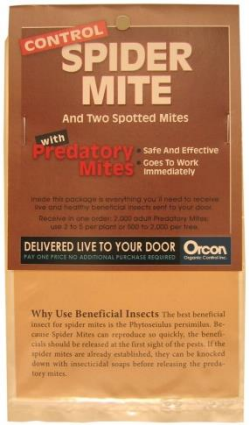
  Children: Eucalyptus oil is **LIKELY UNSAFE** for children. It should not be taken by mouth or applied to the skin. Not much is known about the safety of using eucalyptus leaves in children. It's best to avoid use in amounts larger than food amounts.

  Surgery: Since eucalyptus might affect blood sugar levels, there is concern that it might make blood sugar control difficult during and after surgery. Stop using eucalyptus at least 2 weeks before a scheduled surgery.

What products are NOT pesticides?

- Insect parasitic nematodes
- Rodent or insect traps
- Beneficial insects or mites



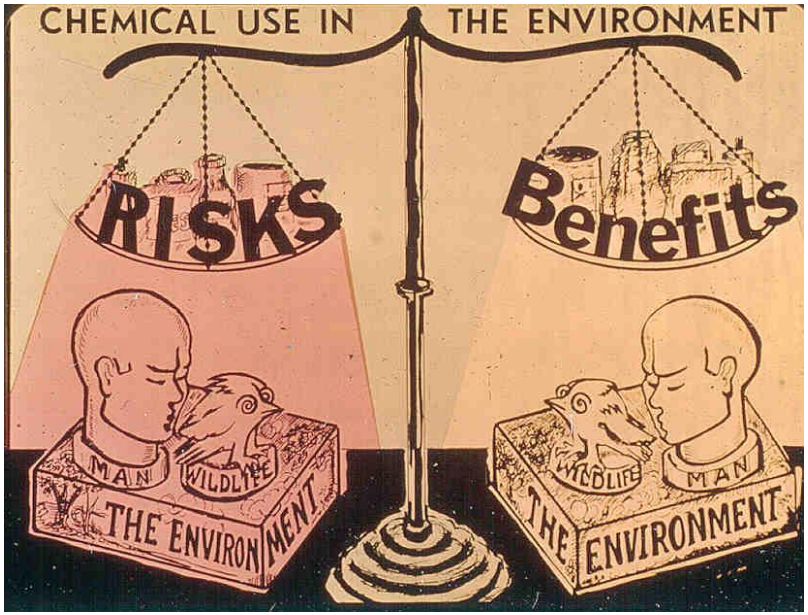


No endorsement intended or implied

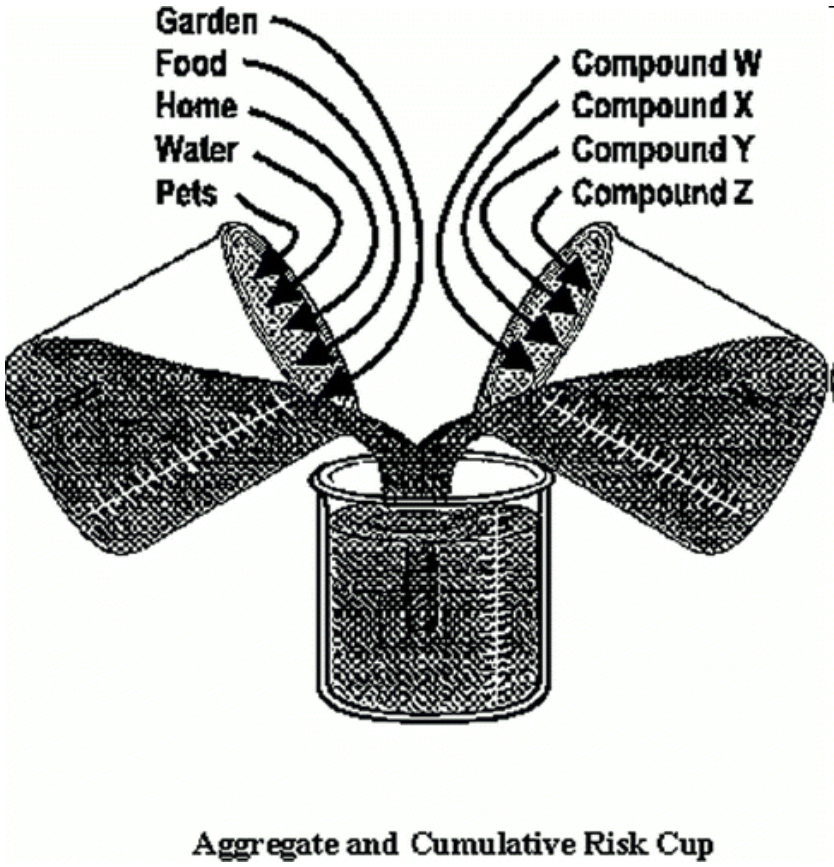
What does registration mean?

- Not a safety guarantee
- Reasonable certainty of no harm, but NOT risk free
- Must read and follow the label to manage the risk

Risk assessment



Prior to 1996 FQPA



Aggregate and Cumulative Risk Cup

After 1996 FQPA

What are the benefits?

- Aesthetics

- Healthy saleable plants & produce

What are the benefits?

- Bountiful harvest

BROWNTAIL MOTH

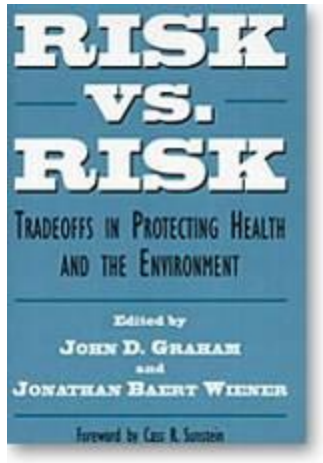
DEER TICK

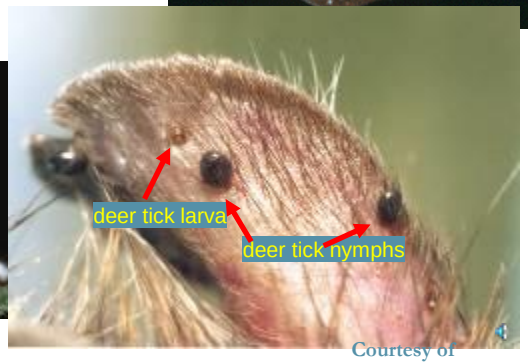
- Nuisance or public heath pest control

OH FOR CRYING OUT LOUD ETHEL, STOP SCREAMING, JUST HOW BIG CAN ONE GYPSY MOTH BE?

Risk vs. Risk

- West Nile Virus & EEE
  Malaria
- Potato Late Blight Disease
- Lyme Disease





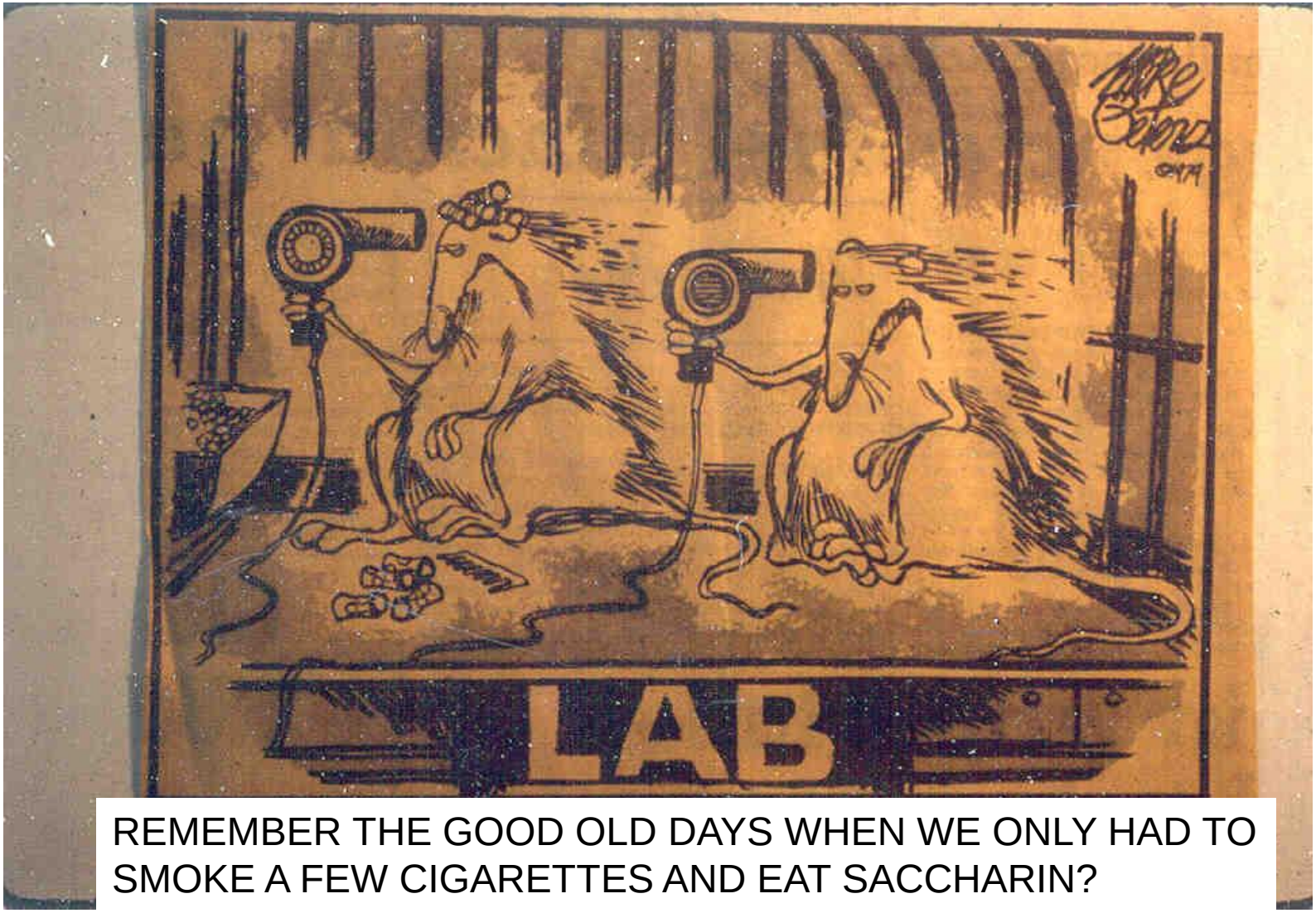
Courtesy of
Kevin Byron

What are the human risks?

- Acute
  - Rash
  - Nausea
  - Eye ticks
  - Stomach cramps
  - Death

- Chronic
  - Cancer
  - Birth defects
  - Allergies
  - Organ damage
  - Endocrine effects

How are the risks determined?



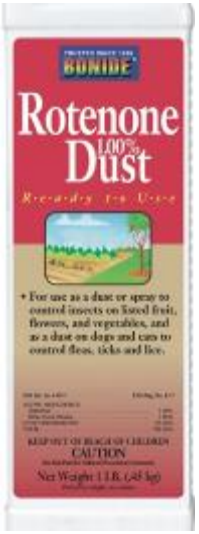
REMEMBER THE GOOD OLD DAYS WHEN WE ONLY HAD TO SMOKE A FEW CIGARETTES AND EAT SACCHARIN?

All pesticides have risks!!!

- Organic ≠ Safe

- Synthetic ≠ Highly toxic

- Natural ≠ Safe



No endorsement intended or implied

Even natural or organic products are toxic!

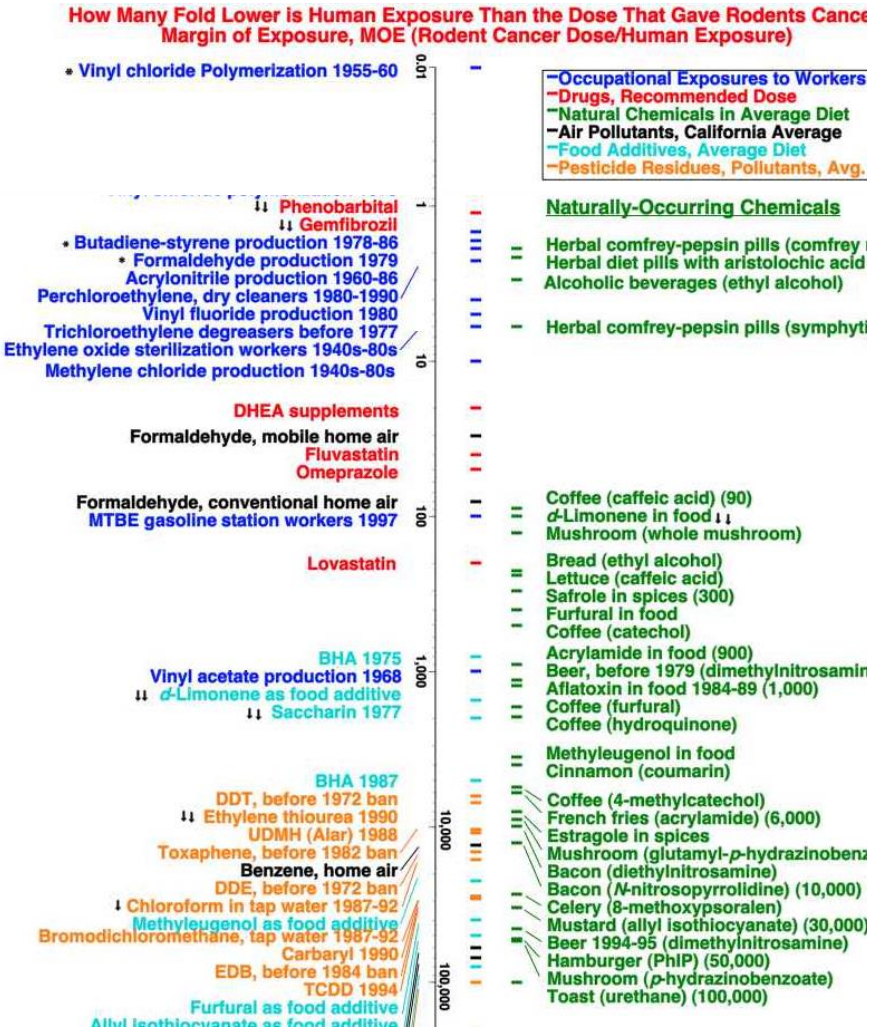


TABLE 2-12 Original chart from Pests of the Garden and Small Farm by Mary Louise Flint Amended by Gary Fish September 2007

Oral LD_{50} Values for Some Pesticides Used in Small Farms and Gardens.

CHEMICAL	COMMON TRADE NAMES	ORAL LD_{50}[a]	EIC[b]	TYPE OF PESTICIDE
Nicotine	Black Leaf 40	55	45[1]	insecticide
Rotenone*		132	33	insecticide
Bordeaux*		300	68	fungicide
Diazinon		300	43	insecticide
2,4-D		375	17	herbicide
Carbaryl	Sevin	500	21	insecticide
Acephate	Orthene	866	23	insecticide
Copper hydroxide*	Kocide	1000	33	fungicide
Copper oxychloride sulfate*	C-O-C-S	1000	33[1]	fungicide
Ryania*		1200	55	insecticide
Malathion		1375	24	insecticide
Pyrethrum*		1500	18	insecticide
Propargite	Omite	2200	43	acaricide
Sabadilla*		4000	36	insecticide
Glyphosate	Round-up	4300	15	herbicide
Cryolite*	Kryocide	10,000	21	insecticide
Benomyl	Benlate	>10,000	53	fungicide
*Bacillus thuringiensis**	Dipel	15,000	8	insecticide

NOTE: Some materials on this list may not be currently registered as pesticides or their use may be restricted.

*asterisk indicates chemical was acceptable for organically grown produce.

[a]LD_{50} indicates the amount of pesticide that will kill half of a group of test animals. These values are for milligrams of pesticide per kilogram of body weight. These figures do not provide an indication of the chronic health risk or persistence in the environment.

[b]EIC or Environmental Impact Quotient is a method to calculate the environmental impact of most common fruit and vegetable pesticides (insecticides, acaricides, fungicides and herbicides) used in commercial agriculture. The values obtained from these calculations can be used to compare different pesticides and pest management programs to ultimately determine which program or pesticide is likely to have the lower environmental impact.

[1]Estimated EIQ.

"All substances are poisons; there is none which is not a poison. The right DOSE differentiates a poison from a remedy."

—Paracelsus (1493-1541)

Even too much water can kill – over 1.5 liters/hour

Woman dies after water-drinking contest

Water intoxication eyed in 'Hold Your Wee for a Wii' contest death

Associated Press

Updated: 10:24 p.m. ET Jan 13, 2007

SACRAMENTO, Calif. - A woman who competed in a radio station's contest to see how much water she could drink without going to the bathroom died of water intoxication, the coroner's office said Saturday.

Jennifer Strange, 28, was found dead Friday in her suburban Rancho Cordova home hours after taking part in the "Hold Your Wee for a Wii" contest in which KDND 107.9 promised a Nintendo Wii video game system for the winner.

"She said to one of our supervisors that she was on her way home and her head was hurting her real bad," said Laura Rios, one of Strange's co-workers at Radiological Associates of Sacramento. "She was crying and that was the last that anyone had heard from her."

NBC VIDEO

Launch

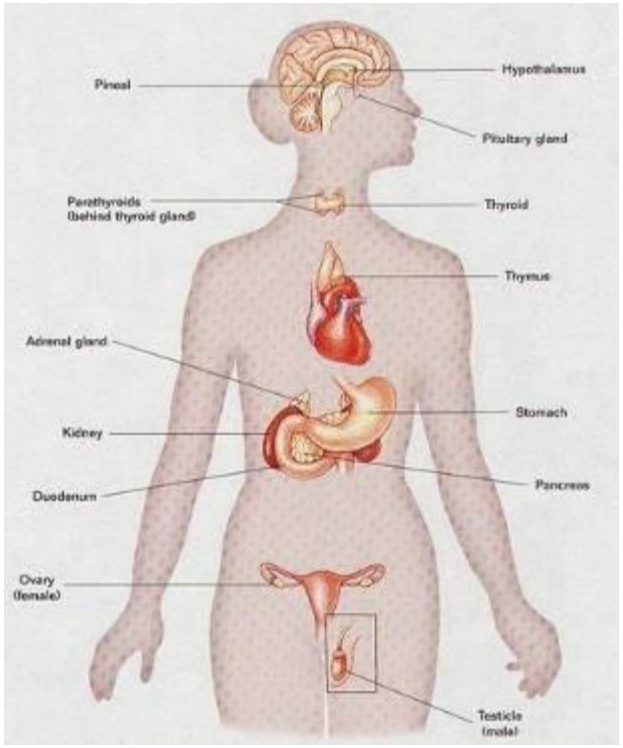
Woman in water drinking contest dies

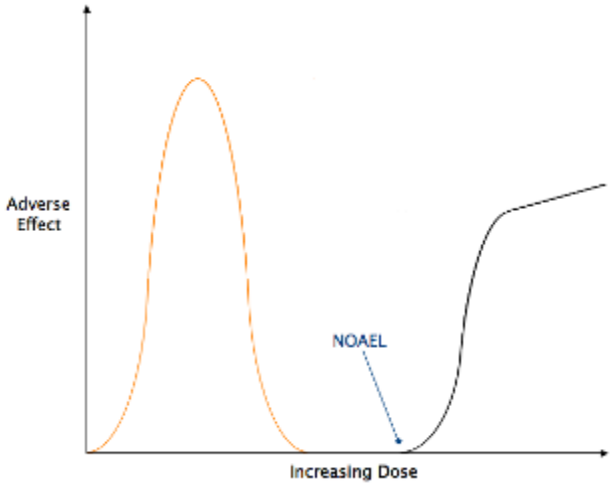
Jan. 15: Sacramento Bee reporter Christina Jewett talks to MSNBC-TV's Contessa Brewer about the death of a woman who had competed in a radio station contest.

MSNBC

Endocrine effects

- EPA just finished the initial screening of 52 active ingredients.
  - 34 were not judged to be endocrine disruptors
  - 18 of 18 showed potential effects on the thyroid
  - 17 of 18 showed potential androgenic effects
  - 14 of 18 showed potential estrogenic effects
- EPA will now require additional tests to determine if any of the 18 truly are endocrine disruptors
- www2.epa.gov/ingredients-used-pesticide-products/endocrine-disruptor-screening-program-tier-1-assessments
- Does the dose make the poison?? What about hormesis?
- http://www.belleonline.com/index.htm





=

X

No endorsement intended or implied

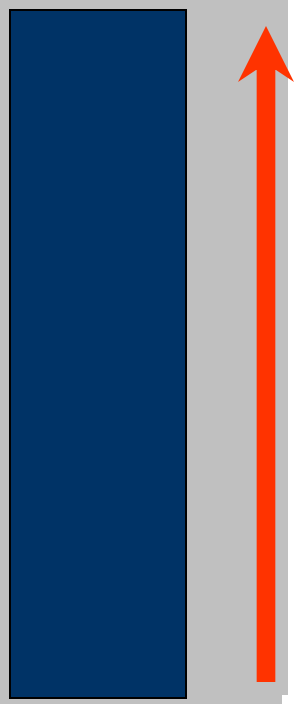
One way to quickly assess the risk?

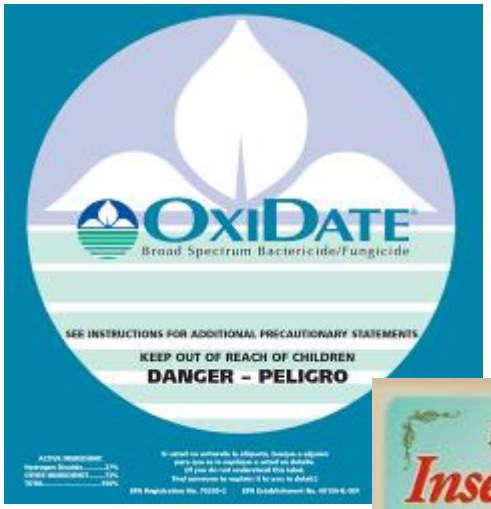
Signal Words

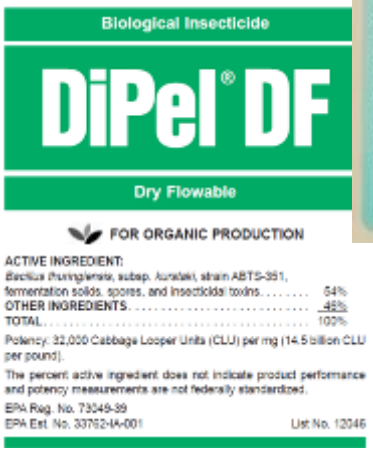
Danger

Warning

Caution



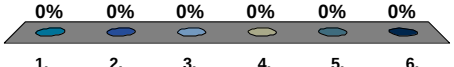




No endorsement intended or implied

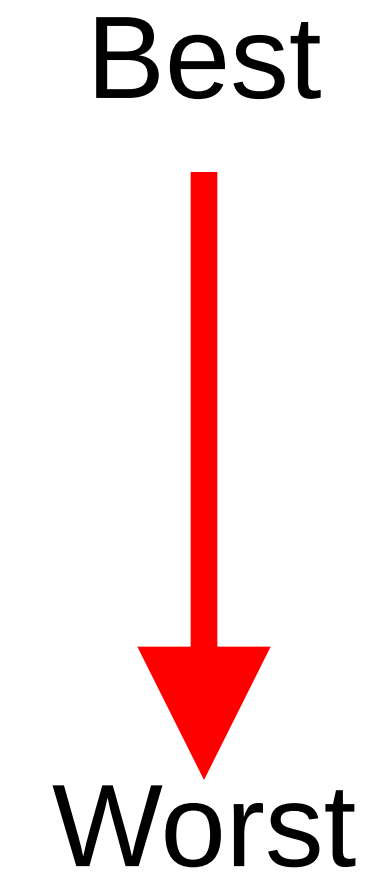
Please choose the two pesticide formulation types with the lowest exposure potential

	Formulation Type	Percent Active Ingredient
1.	Granular	3 - 15%
2.	Ready to Use Baits, Gels or Liquids	1 - 15%
3.	Dust	5 - 10%
4.	Aerosol	1 - 5%
5.	Wettable Powder	50 - 85%
6.	Liquid Concentrate	40 - 90%



Reduce exposure by using targeted materials

- Enclosed baits & gels
- Spot treatments
- Broadcast treatments



Which product do you think is the better choice?

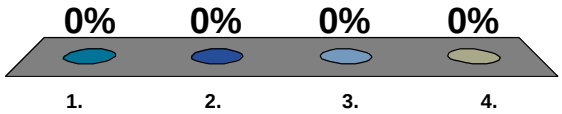
1. A

2. B →

3. C

4. D →

No endorsement intended or implied

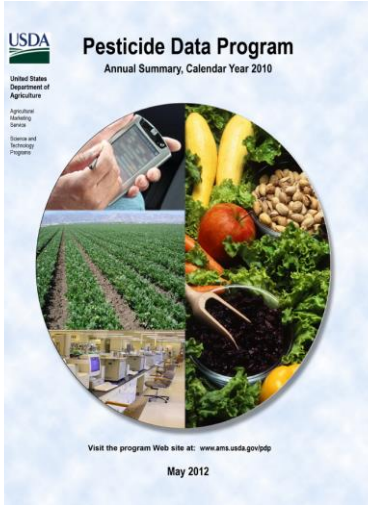


How is risk reduced?- PPE

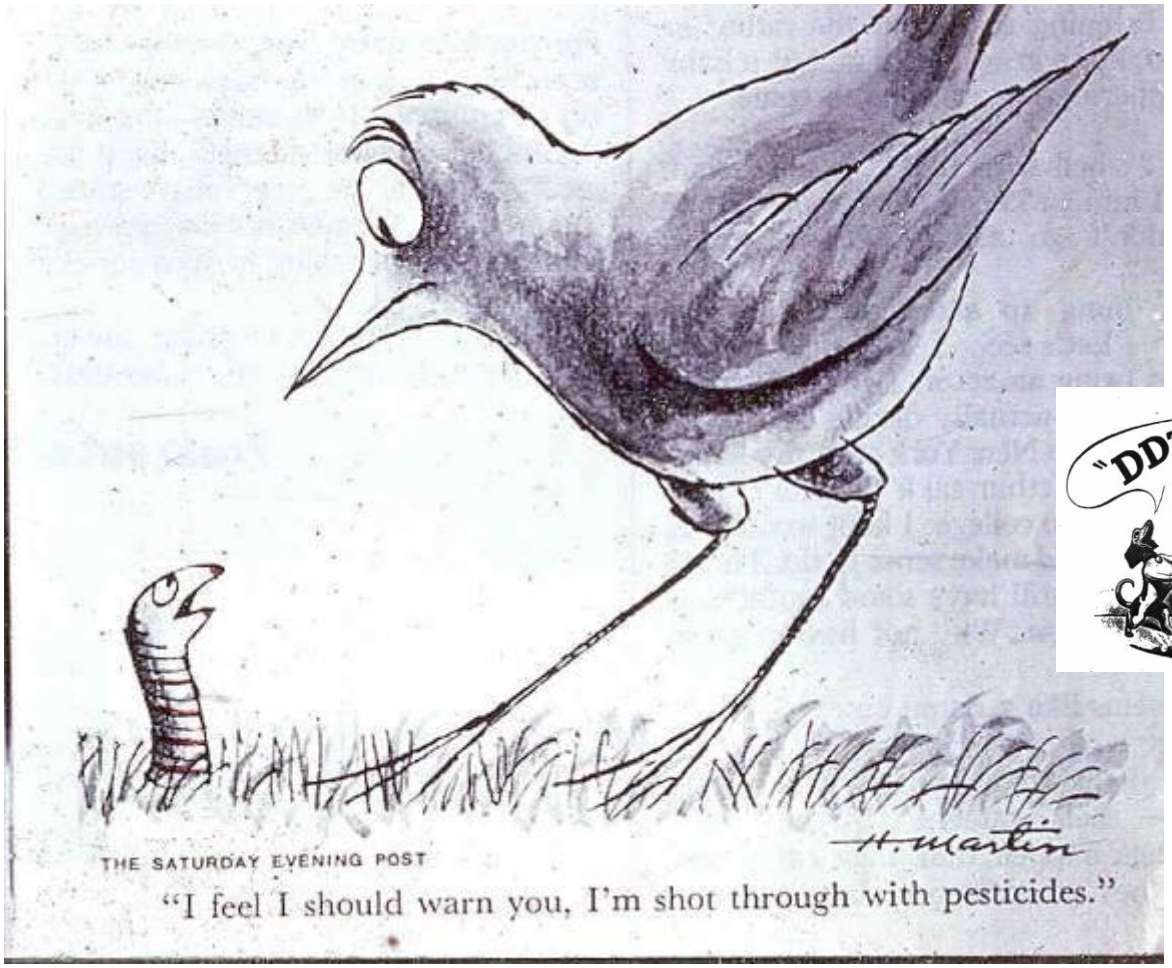
What are some "environmental" risks?

- Wildlife effects

- Residues on food



Remember "Silent Spring"



*Biomagnification of chlorinated hydrocarbons like DDT or Dieldrin was a problem in the 60's & 70's

Today's wildlife concerns

- Biomagnification is not a big issue any more
  - the old extremely persistent products were cancelled
- Pollinators are now a focus area

http://www.beeccdcap.uga.edu/index.html

Recent neonicotinoid research

- The answers are only beginning to emerge, but current research has revealed some results
  - Mites and viruses appear to be the main causes of hive failure along with the mite controls applied by beekeepers
    - Fungicides may exacerbate Nosema disease
  - Sub-lethal levels of some neonicotinoids effect wild bee density, nesting and colony growth
  - Varroa mite levels have been found higher in honey bees hives exposed to sub-lethal levels of imidacloprid
  - Neonicotinoids like this one can be expressed in ornamental plant pollen and nectar at levels much higher than in agricultural uses
    - Mostly found at levels that are sub-lethal

Photo: Matthew Shepherd

No endorsement intended or implied

March 18, 2015 DOI: 10.1371/journal.pone.0118748

Nature 521, 77–80 (07 May 2015) doi:10.1038/nature14420

Toxicity of Common Organic-Approved Pesticides to Pollinators

Toxicity of Common Organic-Approved Pesticides to Pollinators

PESTICIDE	NON-TOXIC	LOW TOXICITY	HIGHLY TOXIC
Insecticides/Repellants/Pest Barriers			
Bacillus thuringiensis (Bt)			
Beauveria bassiana			
Cydia pomonella granulosis			
Diatomaceous Earth			
Garlic			
Insecticidal Soap			
Kaolin Clay			
Neem			
Horticultural Oil			
Pyrethrins			
Rotenone			
Sabadilla			
Spinosad			
Herbicides/Plant Growth Regulators/Adjuvants			
Adjuvants			
Corn Gluten			
Gibberellic Acid			
Horticultural Vinegar			
Fungicides			
Copper			
Copper Sulfate			
Lime Sulfur			
Sulfur			

Soaps and Oils, only when directly sprayed upon the pollinator

Eric Mader – The Xerces Society for Invertebrate Conservation

Recent research on botanical pesticides

* Acute Toxicity and Sublethal Effects to Honey Bees
  * Andiroba oil, Garlic extract, Eucalyptus oil, Rotenone, Neem oil and Citronella oil applied to adults and fed to larvae
    * All but Andiroba oil caused significant mortality to adult bees
    * Andiroba, Garlic and Neem caused significant larval mortality
      * These may work like insect growth regulators preventing ecdysis (moulting)

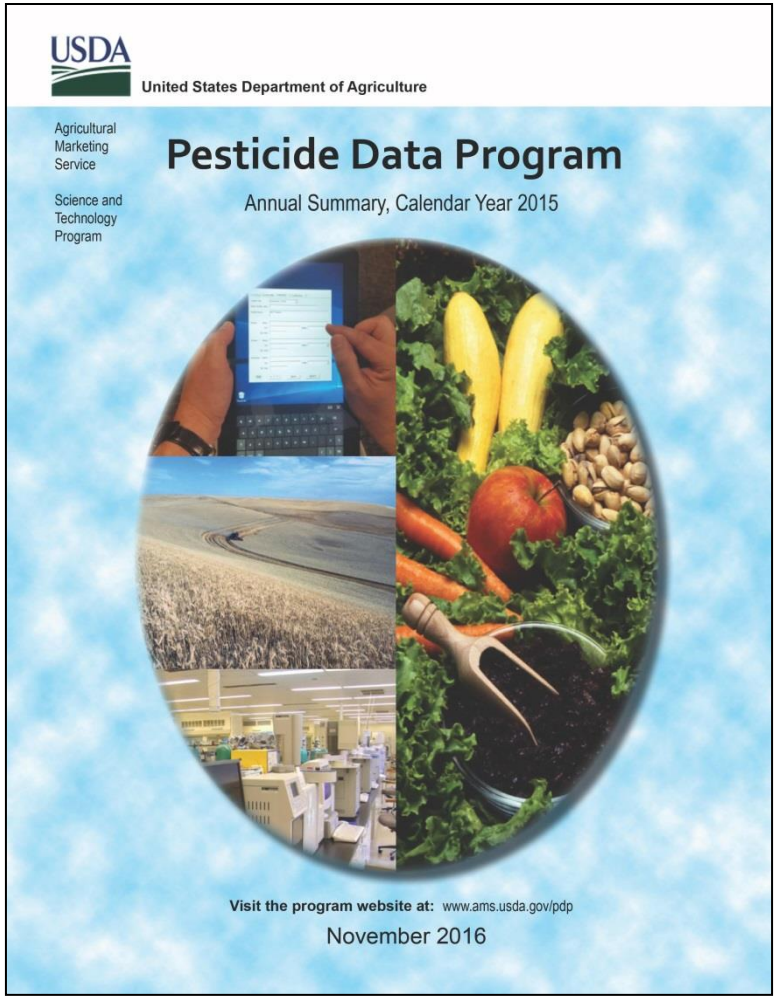
J. Insect Sci. (2015) 15(1): 137; DOI: 10.1093/jisesa/iev110

Pesticide residues are found on all types of food

- Samples are randomly chosen near the point of consumption, and
- Samples reflect what is typically available to the consumer throughout the year
- Samples are selected without regard to country of origin, variety, or organic labeling

2015 USDA-PDP Sampling

- USDA – PDP 2015 sampling shows that over 99% of all samples are well below the tolerances set by EPA
- 15% of samples had no detectable residues
- 394 (3.9%) of samples contained extremely low levels of pesticides for which there is no tolerance
- “The data reported by PDP corroborate that residues found in agricultural products sampled are at levels that do not pose risk to consumers’ health”



http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5110007

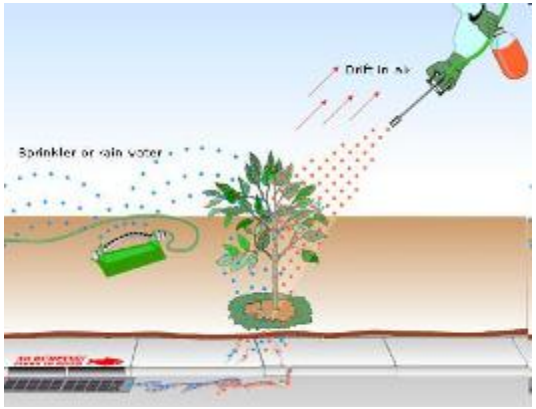
PDP also detects pesticide residues on organic produce

- **According to the 2008 USDA Pesticide Data Program Report:**
  - **43% of organic spinach samples were positive for spinosad**
    (13 of 30 samples positive)
- **According to the 2010 and 2011 USDA Pesticide Data Program Report:**
  - **52% of organic baby food pear samples were positive for spinosad (16 of 31 samples) 2010**
  - **49% of organic baby food pear samples were positive for spinosad (33 of 67 samples) 2011**
- **2013 USDA PDP report**
  - **92% of organic nectarine samples were positive for spinosad**
  - **(11 of 12 samples)**
- **Spinosad is National Organic Program approved and is derived from a naturally occurring soil bacteria**

No endorsement intended or implied

Other pesticide risks

- Drift
- Water contamination
- Storage
- Disposal



Drift

- Check for sensitive areas first!
- Watch the wind speed
- Keep the spray low
- Spray with the breeze
- Don’t apply when over 85°F

Pesticides Can Leach Into Groundwater

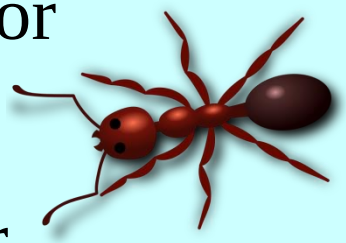
More than two dozen pesticides have been detected in Maine groundwater

Evidence? Maine Studies

- 1980's: Aldicarb (Temik) contamination of 107 wells near potato fields in Aroostook Co.
- 1980-90's: Multiple collaborative studies near potato fields
- 1994 to present: Periodic statewide groundwater and hexazinone monitoring programs

Home pesticide use - Worst case scenario

- Homeowner application of granular diazinon around well casing to control ants resulted in 10x over Maximum Contaminant Level (MCL) for drinking water.

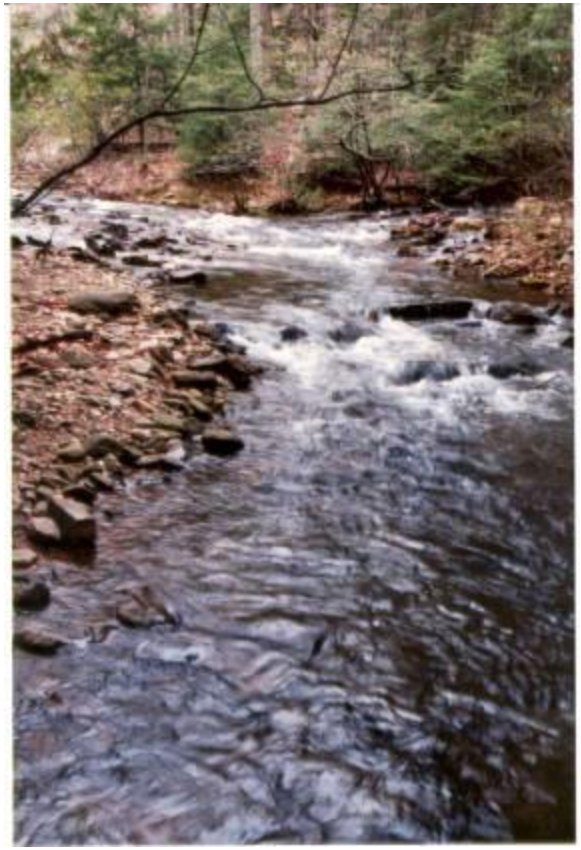


- Detected during 1994 statewide groundwater monitoring of 129 wells for agricultural pesticides
- Of 31 samples with positive detections, 30 below health advisory levels (HAL), Maine exposure guidelines (MEG), maximum contaminate levels (MCL)

Agricultural Use Groundwater Monitoring Results

- 50 wells sampled near blueberry fields in 2015
  - 41 wells with detections
  - 7 different herbicides found
  - No detections above health advisory or maximum exposure levels

Pesticides Can Run-off Into Surface Waters



Surface Water/sediment Sampling – Home, Lawn & Garden Pesticides

- Pesticide residues detected in surface water
  - Diazinon up to (2.6 ppb)**
  - 2,4-D up to (36.4 ppb)
  - Dicamba up to (4.1 ppb)
  - MCPP up to (26 ppb)
  - MCPA up to (0.45 ppb)
  - Clopyralid up to (0.91 ppb)
  - Propiconazole up to (0.075 ppb)
  - Chlorothalonil up to (0.22 ppb)
  - Found Excess Nitrogen & Phosphorous in most samples
- Pesticide residues detected in sediments
  - Bifenthrin up to (37 ppb)
  - Permethrin up to (47 ppb)
  - Cypermethrin up to (5 ppb)

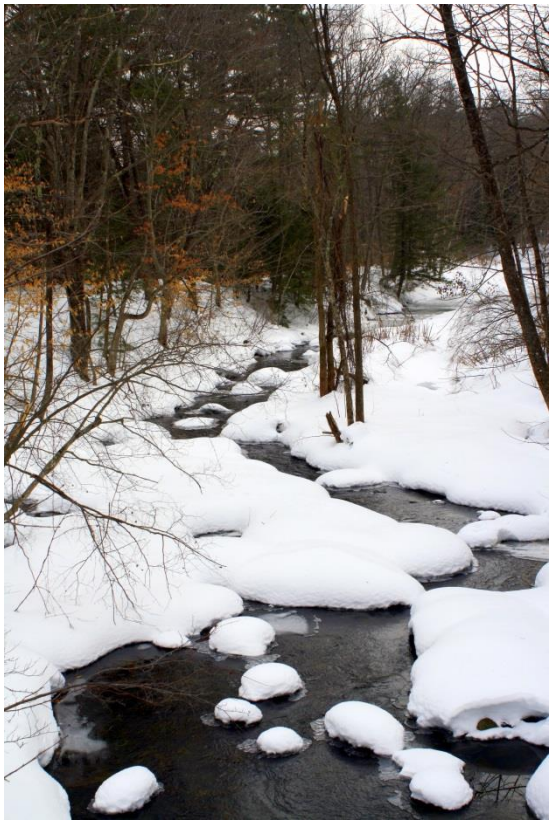
**Values in red exceed Aquatic Life Criteria

BPC Gulf of Maine Study 2015

- 20 of 20 stormwater sites, Kittery to Whiting, with detections
- 22 pesticides and fipronil degradates in water
  - Bifenthrin exceeded aquatic life criteria at 7 sites, permethrin at 1 site
- 2 pyrethroids in sediment
  - Bifenthrin at 7 of 14 sites, esfenvalerate at 1 site

USGS National Water Quality Assessment

- Sampled urban streams
  - Insecticides occurred more frequently in urban streams than they did in agricultural area streams
  - Herbicides detected in 99% of Urban stream samples
  - Phosphorous found at same levels as in agricultural streams
    - 70% of those samples exceeded the EPA desired goal for reducing nuisance plant growth (algae)



Prevent water contamination

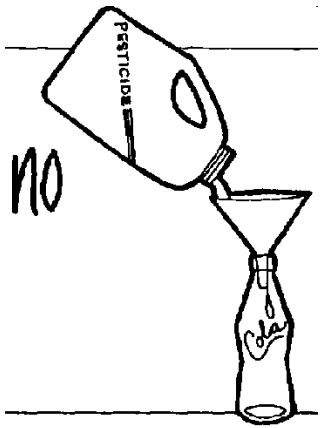
- Locate & stay away from wells
- Stay away from ledge
- Stay away from wetlands & water
- Do not apply to slopes near water
- Do not apply before heavy rains
- Spot applications
- Vegetative buffers

Storage

- Buy *only* what you need

- Keep them out of reach of children & lock them up

- Keep in original containers



- Never store in basement!

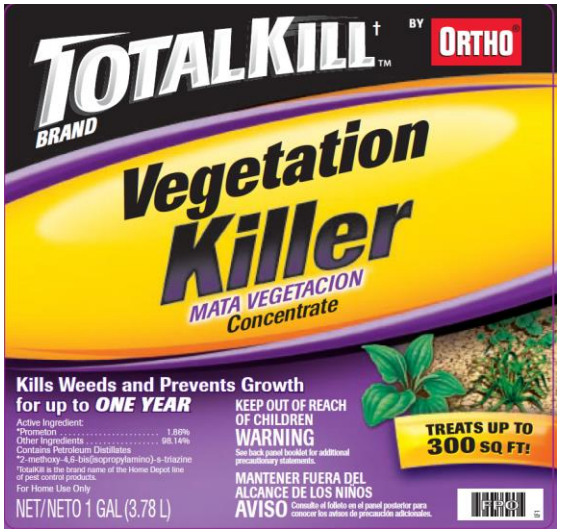
Disposal

- Follow label
- Rinse containers
- Apply extra mix to labeled site
- Call BPC about obsolete pesticides

IMPORTANT- Directions for Storage and Disposal	
STORAGE	Store unused product in an area out of reach of children and animals. Do not store in areas where temperatures frequently exceed 100°F.
DISPOSAL	**If Empty:** • Do not reuse this container. • Place empty container in trash or offer for recycling if available. **If Partly Filled:** • Call your local solid waste agency or toll free 1-800-CLEANUP for disposal instructions. • Never place unused product down any indoor or outdoor drain.

Which product is most risky to handle?

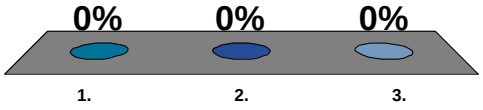
1. A



2. B

No endorsement intended or implied

3. C



Think First…. Spray Last

- "The quick fix is neither"!

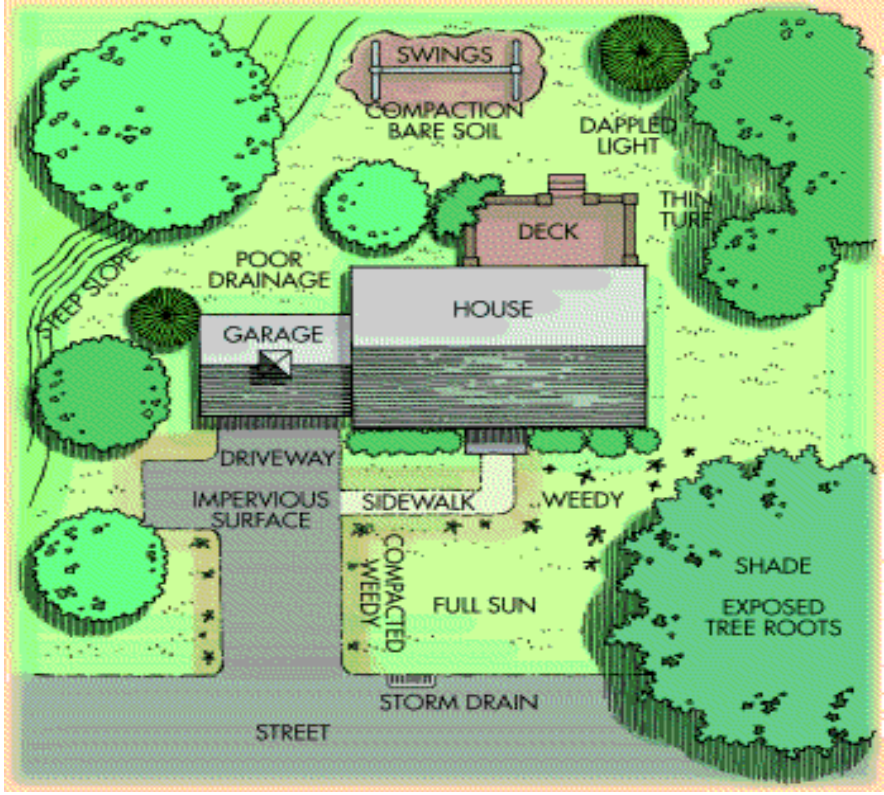
Make the benefits

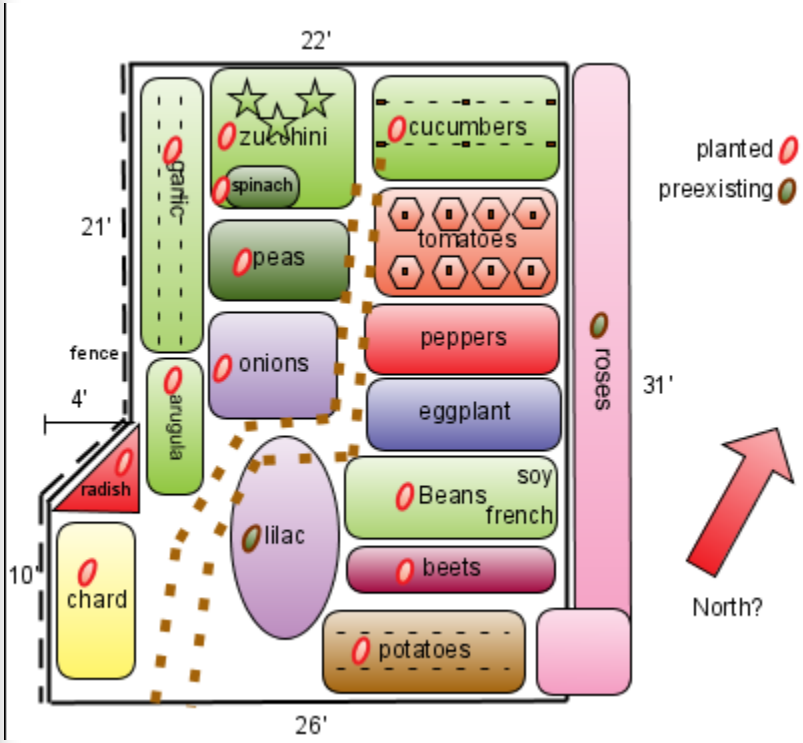
Outweigh the risks

1997 Legislative Mandate

- It is the policy of the State to Minimize reliance on pesticides!

Look at the big picture





Make plans to avoid pest problems

Use site appropriate, non-invasive plants

- Native plants are often well adapted
  - Fewer problems, less work, more rewards, **but not all are problem free**, e.g., viburnums
- Invasive plants are easy to grow but crowd out native vegetation
  - Our local forest habitats are changing rapidly
  - Invasive plants can ruin wildlife habitat
  - Invasive plants harbor more infected deer ticks

Wild Columbine

Viburnum Leaf Beetle

Oriental Bittersweet

Right plant, right place, right purpose

- Choose plants based on the site conditions not just for their color
- Select plants that thrive under existing conditions rather than trying to alter the conditions to meet the needs of a plant
- Minimize disturbance of the existing landscape

Wild Cranberry Bog

Use a diversity of plants and grasses

- Less noticeable damage from pests and disease
- Incorporate many layers of plant types
  - Trees
  - Shrubs
  - Ground covers
  - Perennials, and
  - Lawns

Create wildlife habitats

Diversity and plant layers go hand in hand with habitat creation

Add nectar and fruit producing plants

Strive for continuous blooms

Add water, walls, feeders, woody debris

Habitat enhancement for beneficials

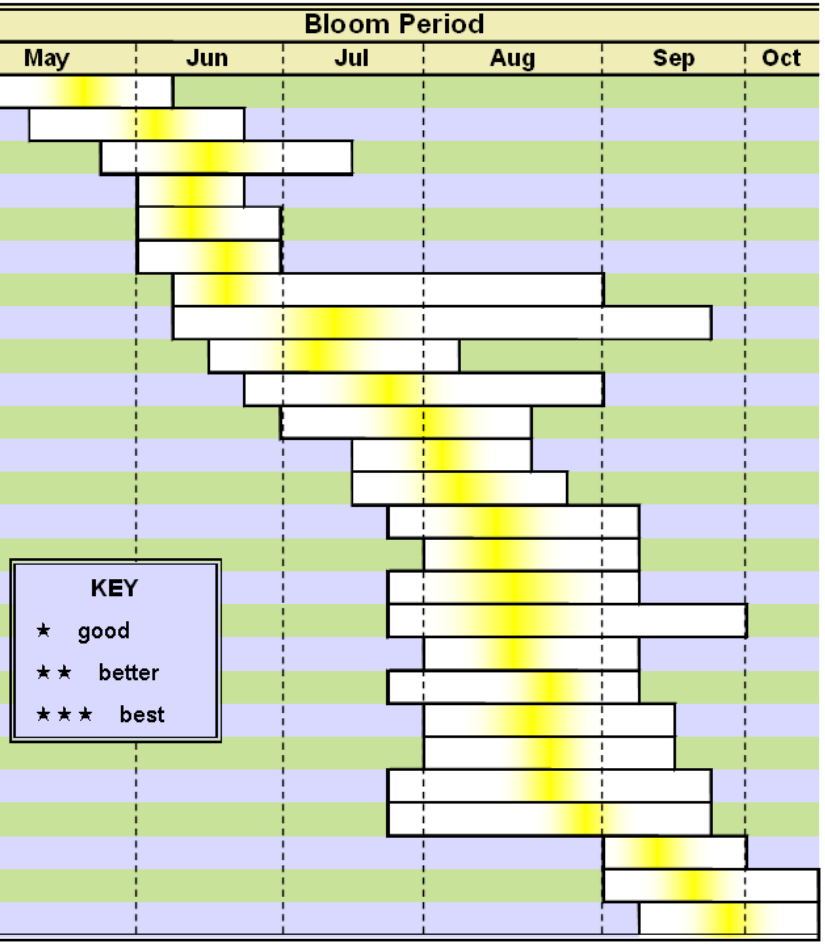
Many beneficials require pollen and/or nectar as dietary supplements

Provide a series of plants that, collectively, provide continuous nectar/pollen supply

Many plants benefit natural enemies and pollinators

Bloom Timing of Native Plants Attractive to Beneficial Insects

Native plant	Natural enemies	Bees
wild strawberry	★★	★
golden Alexanders	★★★	★★
Canada anemone	★★★	★
penstemon	★★	★★
angelica	★★★	★
cow parsnip	★★★	★
sand coreopsis	★★★	★
shrubby cinquefoil	★★★	★
Indian hemp	★★★	★
late figwort	★★	★★
swamp milkweed	★★	★★
Culver's root	★★	★★★
yellow coneflower	★★★	★★
nodding wild onion	★	★★
meadowsweet	★★★	★★
yellow giant hyssop	★★	★★★
horsemint	★★★	★★
Missouri ironweed	★★	★★
cup plant	★★★	★★★
pale Indian plantain	★★	★★
boneset	★★★	★★
blue lobelia	★★★	★★★
pale-leaved sunflower	★★★	★★
Riddell's goldenrod	★★★	★★★
New England aster	★★★	★★
smooth aster	★★	★★



MICHIGAN STATE UNIVERSITY

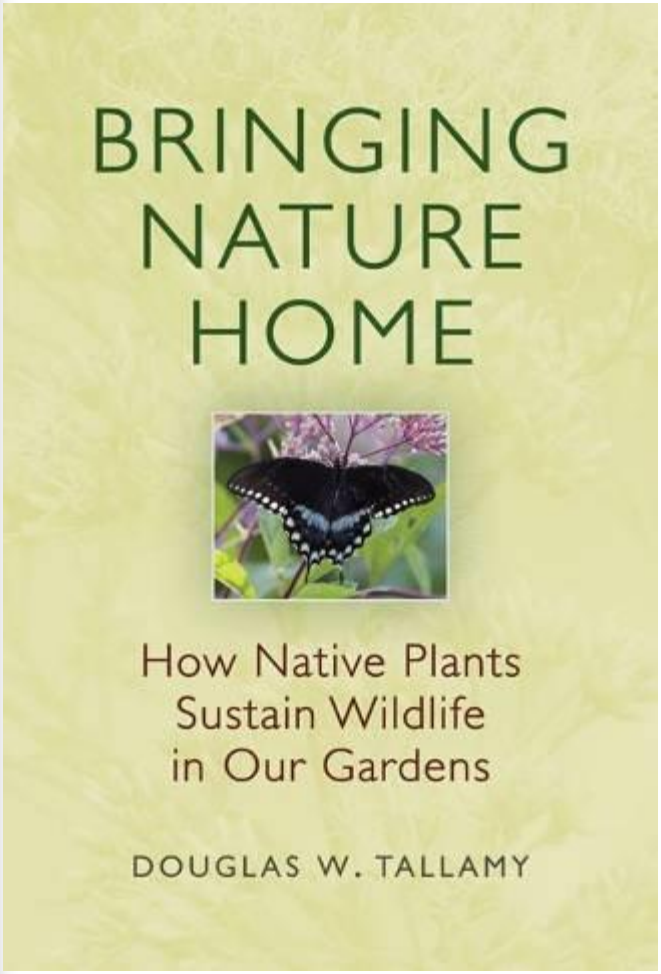
Project GREEEN

Charles Stewart MOTT FOUNDATION

North Central Region SARE
Sustainable Agriculture Research and Education

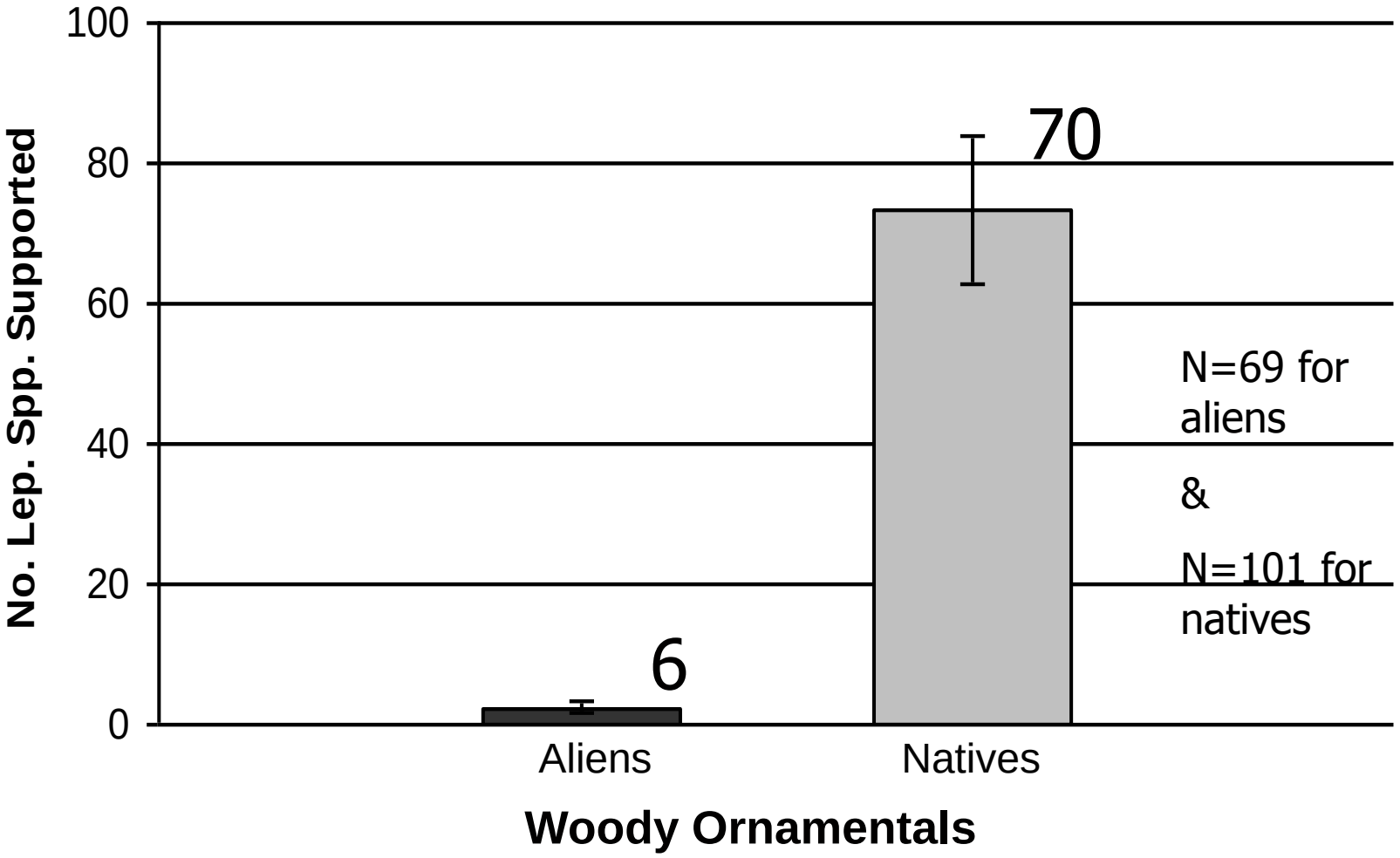
Pretty ornamentals? Pests?

Birds can also be our allies



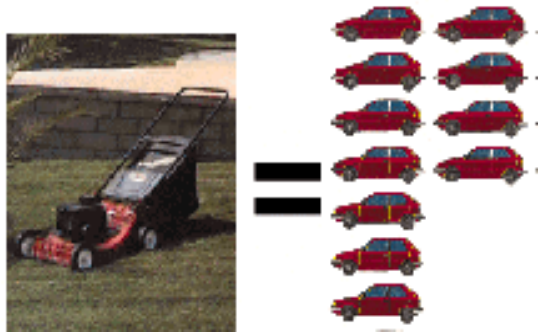
http://www.bringingnaturehome.net/

On average natives support 12x more lepidopteran species



Reduce lawn area

- Reduces
  - Water & air pollution
  - Water usage
  - Maintenance
  - Costs
- Gives
  - More free time



Mower exhaust = 11 cars' exhaust

One hour of mowing = driving 400 miles

Mowers spew 87 lbs of greenhouse gases and 40 pounds of other pollutants annually

Use low input plant varieties

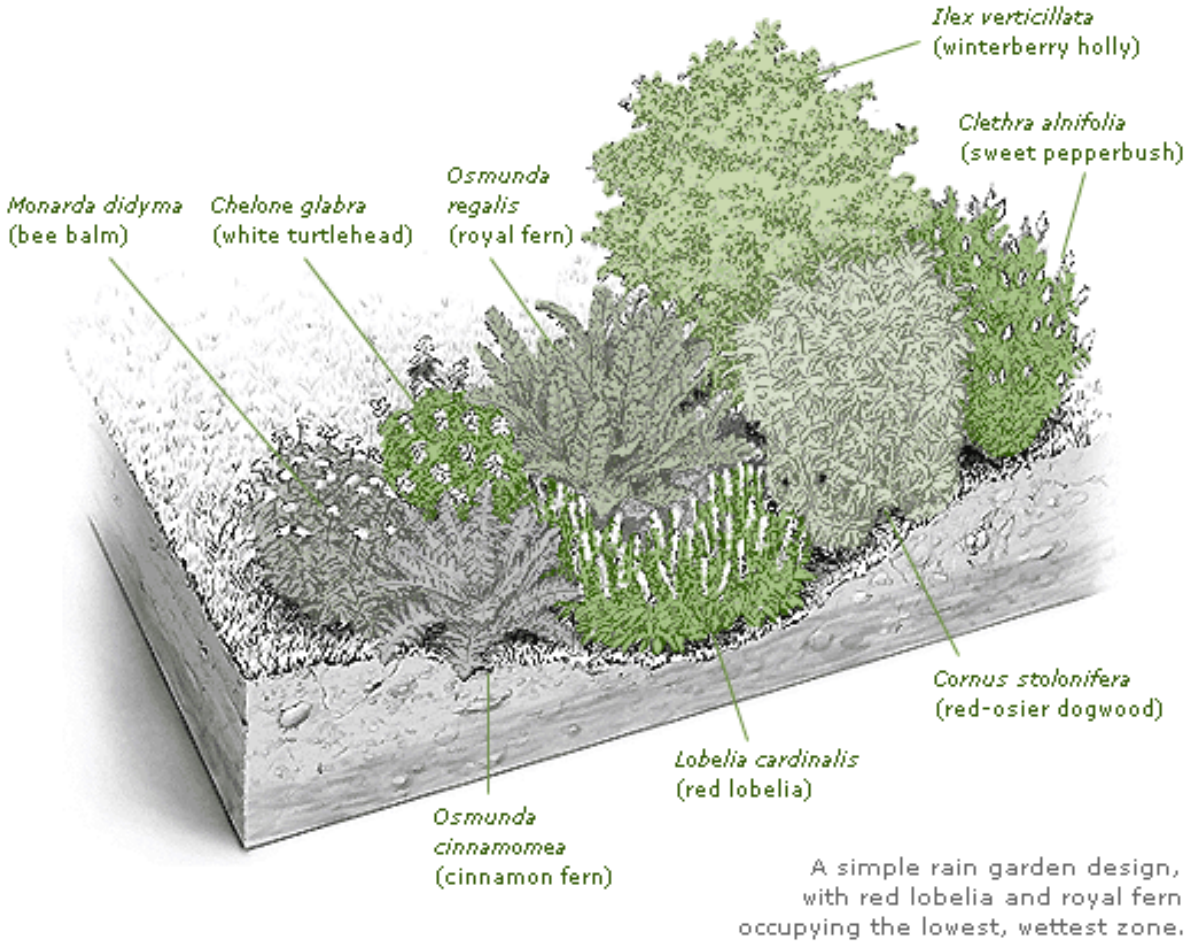
- No-mow fescue vs Kentucky bluegrass
- Pagoda dogwood vs flowering cherry
- River birch vs paper birch

Protect lakes & streams with buffers

- Preserve existing landscape
- Winding paths
- Don’t mow to the water’s edge
- Leave the duff

Reduce runoff

- Reduce amount of impervious (hard) surfaces
- Create rain gardens or install rain barrels
- Direct water into vegetated areas
- Irrigate properly and only when needed



A simple rain garden design, with red lobelia and royal fern occupying the lowest, wettest zone.

Reduce reliance on pesticides, fertilizers and water

- Grow plants that are resistant to insects & diseases
- Use plants that tolerate low fertility
- Use drought resistant plants

White Fir

Sweet Fern

Use common sense pest management

- Integrated pest management
  - Know your pest
  - Cultural practices
  - Mechanical methods
  - Use pesticides as last resort

YardScaping Gardens *at Back Cove*

MANAGE PESTS WISELY

Weed, insect and disease control products present both risks and benefits.

Follow these simple steps to protect people, pets, plants and watersheds:

- know the pest
- pull, squash or trap it
- use control products as a last resort, *if at all*
- spot treat only
- protect beneficial organisms

Want to get involved or learn more?
Visit www.yardscaping.org

Know Your Pest

- Identify the pest

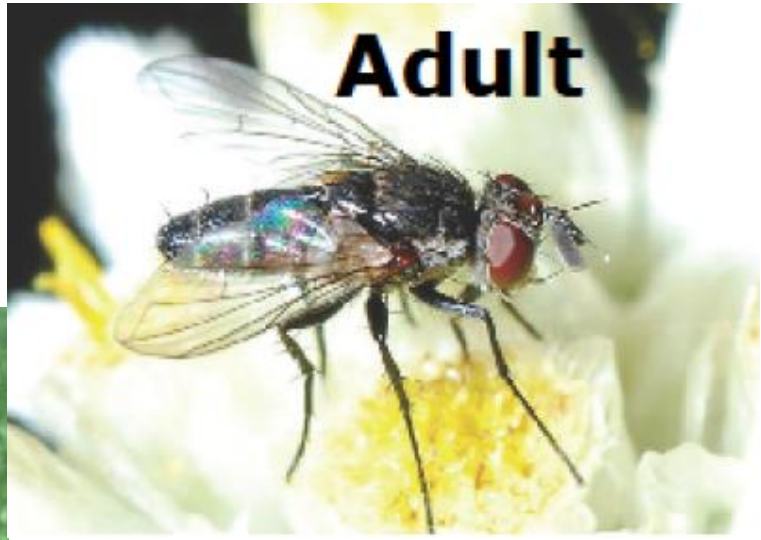
Is it a pest problem?

Is this a disease?


5361045

Welcome or Unwelcome?

1. Welcome
2. Unwelcome



Tachinid fly (the so-called “winsome fly”) laying an egg on a Japanese beetle adult

Istocheta* (=*Hyperecteina*) *aldrichi
Introduced into US from Japan in 1922
Adults emerge Late June/July, feed on honeydew, nectar

- **Lay up 100 eggs in two weeks**
- **Eggs hatch 1 day later, dig into beetle**
- **Kills beetle in 5-6 days**
- **Just before death, beetle digs into ground where fly spend winter as pupa**

Joshua P. Basham
T.S.U. Otis L. Floyd Nursery Research Center
McMinnville, TN 37110-1367
From Point Sebago Golf Course, Casco, Maine

We love the good “bugs!”

Welcome or Unwelcome?

1. Welcome
2. Unwelcome

Good bug in action

Welcome or Unwelcome?

1. Welcome
2. Unwelcome

Flower fly larvae eat aphids!

Science fiction monster?

Delicate beauty

Proceed with caution to protect beneficial insects

- Dragonflies
- Spiders
- Small parasitic wasps
- Predatory mites
- Syrphid flies
- Ground beetles

Know Your Pest

- Identify the pest
- Is it really a problem?
- Monitoring
  - When do you need to control it?

Cultural Controls

- Landscape design
  - replace “susceptible” or chronically pest-prone plants with resistant or non-susceptible plants
  - increased plant diversity and habitat complexity can increase natural enemies present (Shrewsbury 1996)

Cranberry Viburnum

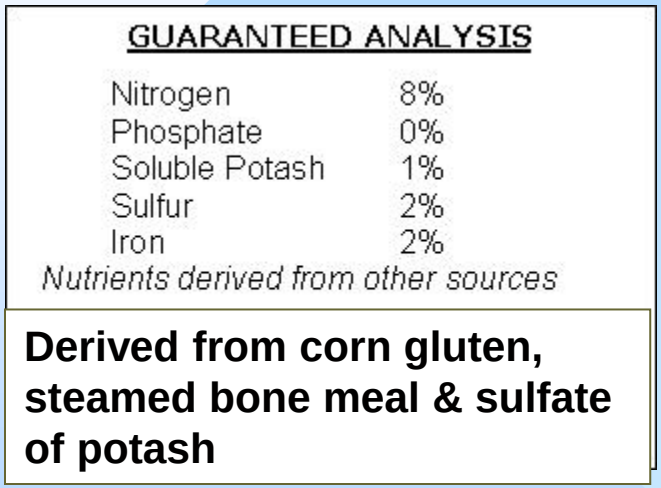
Siebold viburnum

Cultural controls

- Fertilizer
  - over fertilization can cause the “aphid effect”
  - high nitrogen fertilizers may help the pest more than the plant

No endorsement intended or implied

Select slow release fertilizers



GUARANTEED ANALYSIS

Nitrogen	8%
Phosphate	0%
Soluble Potash	1%
Sulfur	2%
Iron	2%

Nutrients derived from other sources

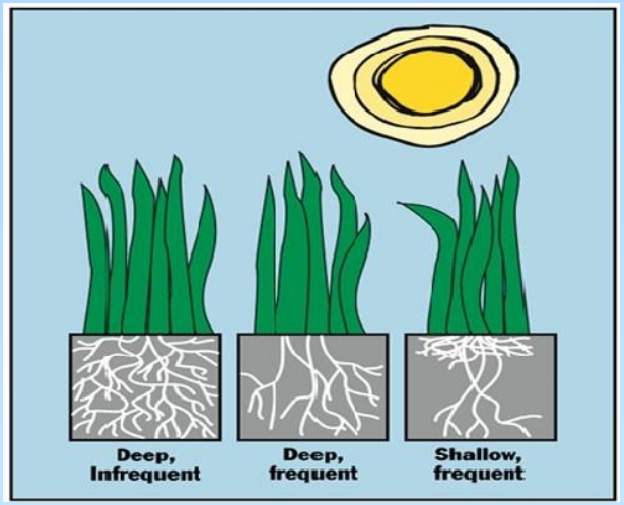
Derived from corn gluten, steamed bone meal & sulfate of potash

- **GUARANTEED ANALYSIS**
- Total Nitrogen (N).....8.00%
  1.0 % Water Soluble Nitrogen
  7.5 % Water Insoluble Nitrogen
  Available Phosphate (P205).....0.0 %
  Soluble Potash (K20).....1.0 %
- **NON PLANT FOOD INGREDIENTS**
  Bacillus subtilis, Bacillus licheniformis, Bacillus pumulis, Bacillus megaterium, Paenibacillus polymyxa, Paenibacillus durum each @ 275,000 CFU per gram of finished product

Look for Water Insoluble Nitogen (WIN)

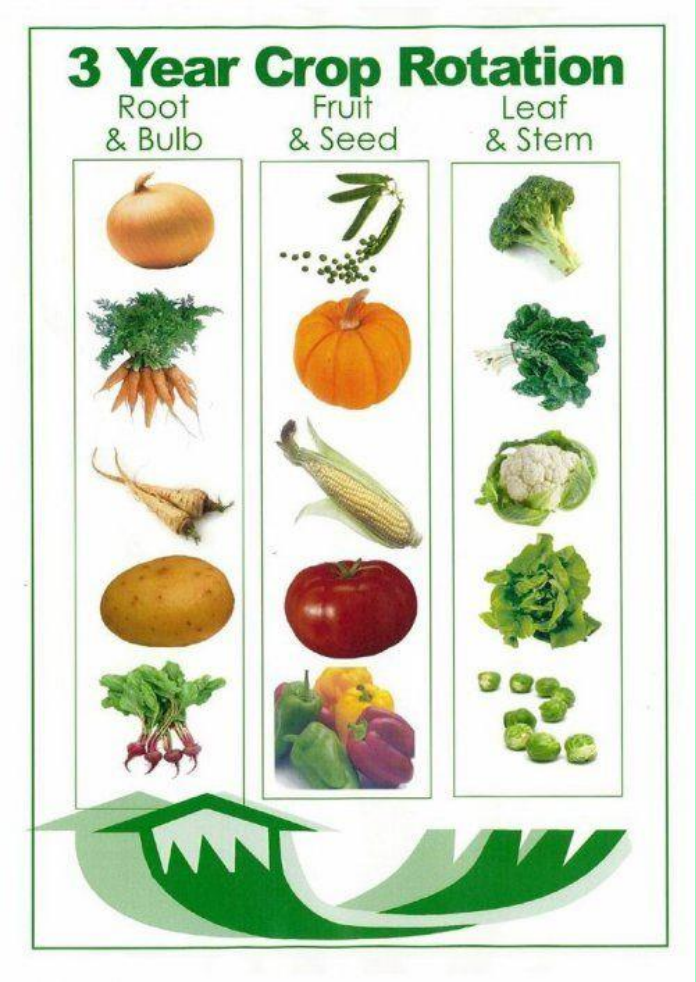
Water management is crucial

- proper irrigation
  - water deeply and infrequently
  - only water the root system
  - water early in the morning



Colorado Potato Beetle

- **Crop Rotation**: Rotate potatoes or eggplant to a field that is at least 200 yards from the previous year's fields.
- **Early planting**: Green sprouting, prepares whole seed potatoes to emerge rapidly, gaining about 7-10 days to harvest.
- **Late planting**: CPB adults that do not find food leave the field in search of greener pastures. Plant after mid- June
- **Straw mulch**: When potato or eggplants are mulched with straw, fewer Colorado potato beetle adults will settle on the plants and fewer eggs will be laid.
- **Biological control**: There are numerous predators and parasitoids that attack CPB adults (a tachinid fly), larvae (12-spotted ladybeetle, spined soldier bug, ground beetles), and eggs. If sprays are needed, selective products will conserve beneficial.



King's Plant Barn©

Cultural Controls – Late Blight

- Do not keep cull piles of potatoes
- Do not save questionable potato seed
- Do not compost diseased tubers,
- Buy seed from a good source
- In the spring, scout, pull and destroy all volunteer potatoes

Look for varieties that are resistant to disease

Defender is the only U.S. commercial potato with late-blight-resistant leaves and tubers.

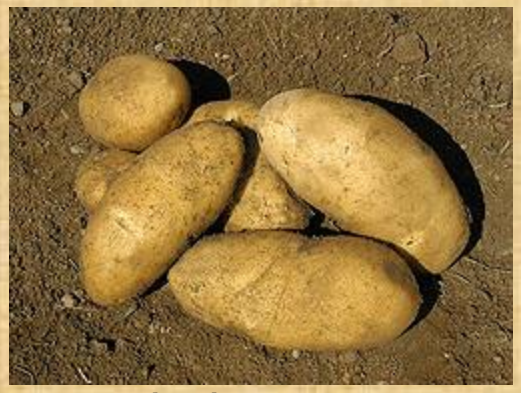


Photo by Peggy Bain

Figure 5 – Potato Varieties

Better	Worse
Red Cloud	Carola
Red Dale	Shepody
Butte	*Red Cloud*
Kennebec	*Red Norland*
Russet	*Kennebec*
Chieftan	*Chieftan*
Elba	
Red Norland	
* Island Sunshine	

* – Commonly reported
Italic – reported both better and worse

http://www.mofga.org/

Japanese Beetle

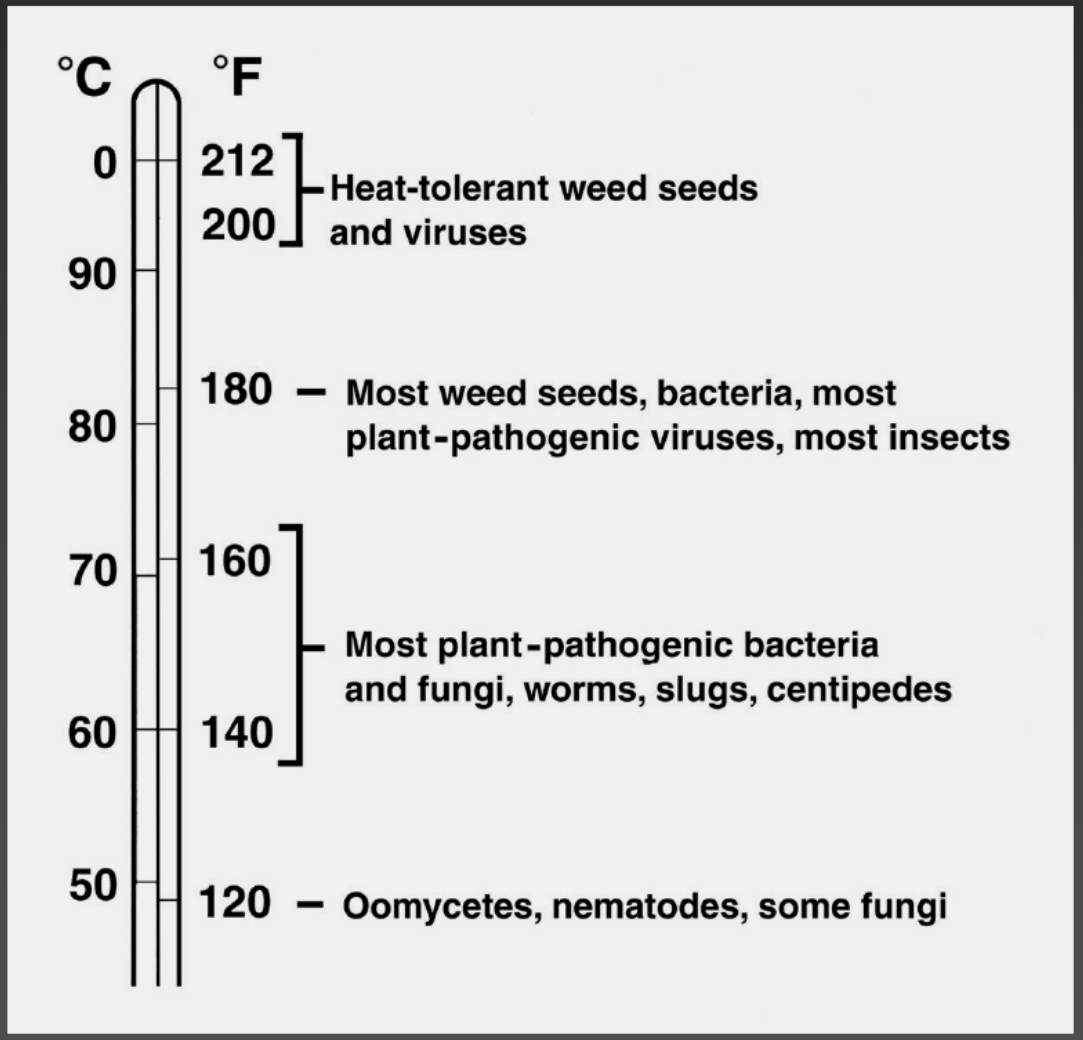
- Select non-preferred shrubs and trees (avoid linden, roses, crabapples, grapes, raspberries, cherries, etc.)
- Cover susceptible plants with protective netting
- Avoid traps
- Use trap plants (Virginia creeper, zinnia, pole beans, etc.)

Kentucky wonder pole beans

Composting?...

NOT diseased material

Temperatures needed to kill plant pests:



Physical IPM Methods

- Mulching
  - Suppress weeds
  - Conserve moisture
  - Provide habitat for natural enemies

Physical Methods

- Exclusion (example: bird netting, row covers)
- Pruning Physical removal
  - hand-pick,
  - shake and capture
  - rake or remove infested tissue

Do you need a pesticide?

- Is the pest in a susceptible stage?
- Application timing is critical
- Is the pest still present?

Is the pest protected?

Birch leafminer

Birch leafminer

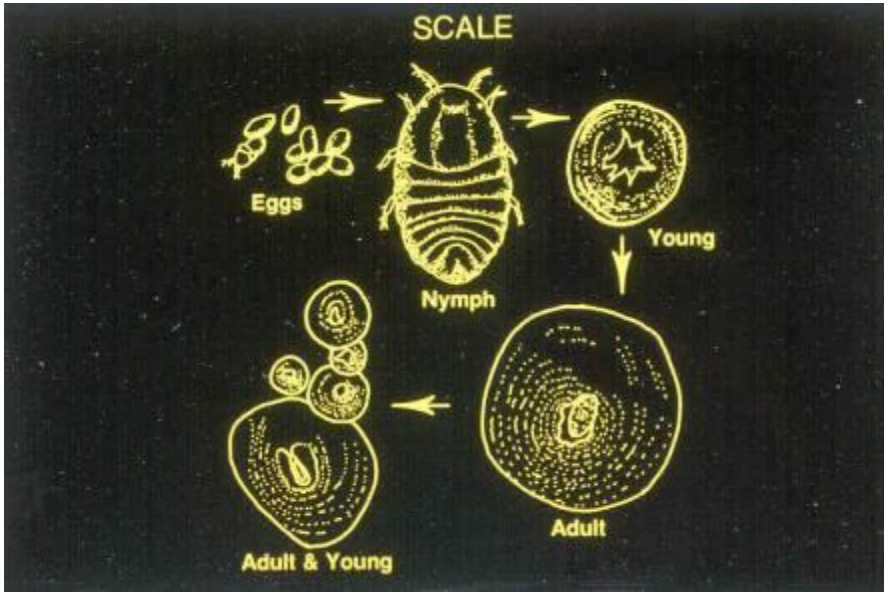
Birch leafminer

Don’t apply when you can’t hit a susceptible target

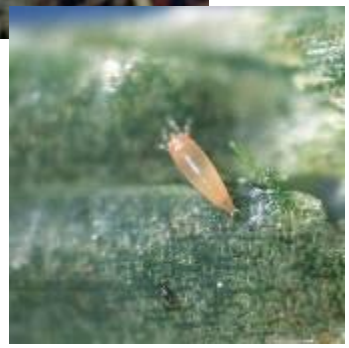

Colorado potato beetle


Lace bugs

Timing is everything?



Nobody home!



Eriophyid gall mite

Oak apple gall wasp

The key to proper use

- Read the label!

Biological Insecticide

DiPel® DF

Dry Flowable

FOR ORGANIC PRODUCTION

ACTIVE INGREDIENT:

Bacillus thuringiensis, subsp. *kurstaki*, strain ABTS-351, fermentation solids, spores, and insecticidal toxins. 54%

OTHER INGREDIENTS 46%

TOTAL 100%

Potency: 32,000 Cabbage Looper Units (CLU) per mg (14.5 billion CLU per pound).

The percent active ingredient does not indicate product performance and potency measurements are not federally standardized.

EPA Reg. No. 73049-39

EPA Est. No. 33762-IA-001 List No. 12046

INDEX:

KEEP OUT OF REACH OF CHILDREN

CAUTION

1.0

FIRST AID	
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.
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 treatment advice.
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.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 800-892-0099 (24 hours) for emergency medical treatment and/or transport emergency information. For all other information, call 800-8-VALENT (682-5368).	

2.0 **PRECAUTIONARY STATEMENTS**

2.1 **HAZARD TO HUMANS AND DOMESTIC ANIMALS**

CAUTION

Harmful if inhaled or absorbed through the skin. Causes moderate eye irritation. Avoid breathing dust or spray mist. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse. Mixer/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

2.2 **Personal Protective Equipment (PPE)**

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks

Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

2.3 **User Safety Recommendations**

- Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- User should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

2.4 **Environmental Hazards**

Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

This product must not be applied aerially within 1/4 mile of any habitats of endangered species or threatened lepidoptera. No manual application can be made within 300 feet of any threatened or endangered lepidoptera.

3.0 **DIRECTIONS FOR USE**

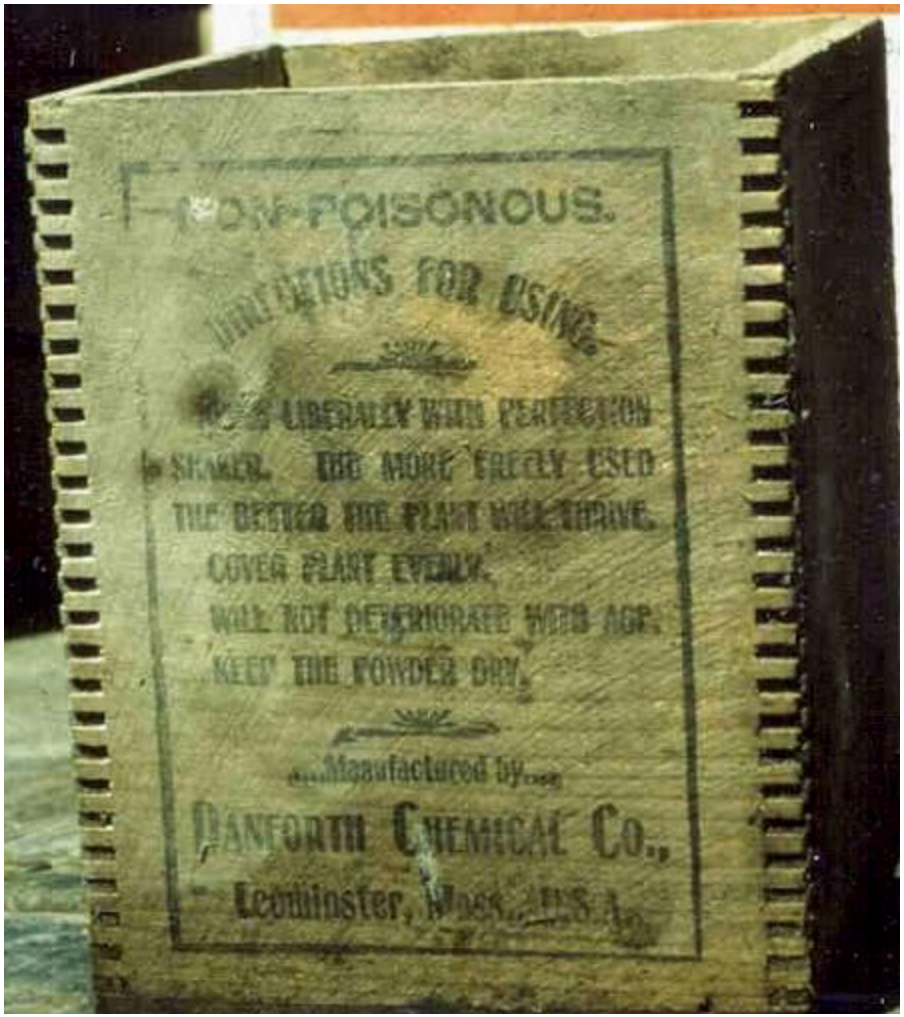
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

SPECIMEN

The old days


12 ½ lb.
BUG DEATH
BUG DEATH
SURE DEATH TO POTATO, SQUASH
AND CUCUMBER BUGS,
CURRANT, TOMATO WORMS, ETC.
PREVENTS BLIGHT.

Great directions!



Contained 5% lead oxide & 47% zinc oxide

"Bug Death is a patented non-poisonous powder, and is entirely different from anything that has ever been placed on the market, and overcomes all the objections to the deadly poisons that the farmers have been obliged to use in the past. It is just as effectual as Paris Green and other dangerous insect powders. It is sure death to the potato, squash and cucumber bugs, currant and tomato worms, also other plant and vine eating pests.

The deadly effect on bugs will not always be as quick, but it is just as sure. Contrary to the arsenic preparations, it is a benefit to the plant, and the more freely used the better the plant will thrive, and for potatoes when blight is prevalent, the extra yield will more than pay all expense of Bug Death."

Today's label

ORTHO®
BUG-B-GON® MAX®
GARDEN INSECT DUST
USE ON VEGETABLES, FRUITS, FLOWERS & SHRUBS

QUICK CONNECT® SPRAYER

Remove sprayer. Pull cord ALL THE WAY OUT.

Insert red plug into spout (on cap) until it clicks.

Flip up spout. Open nozzle at end of sprayer.

Ortho Bug-B-Gon® MAX® controls more than 100 garden and nuisance pests without harming roses, flowers or shrubs. Reapply as directed for a more beautiful garden.

PRODUCT FACTS

KILLS BUGS	Garden Pests: Aphids, beetles, caterpillars, whiteflies and other garden pests.
	Nuisance Pests (outdoors): Ants, cockroaches, spiders, ticks (including ticks that transmit Lyme disease) and other nuisance pests.
WHERE TO USE	On roses, flowers, shrubs, vegetables and fruits.
	Outdoor surface of buildings, porches and patios.

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

Specially formulated for residential use.

80% SIZE
12-digit UPC
(non-processed)
For Position Only
0 71549 01703 3
5-26-05
1040
FPO
ITFXXXXXXX

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

FOR BEST RESULTS

SHAKE WELL BEFORE USE

HOW TO APPLY

Adjust spray nozzle to give a fine spray. When done, flip down spout to close. NO NEED TO DISCONNECT TRIGGER SPRAYER Close nozzle on trigger sprayer. Snap sprayer back in place.

Garden Pests: Hold sprayer about 12 inches from plant. Thoroughly cover all plant surfaces until slightly wet, but not to the point of runoff.

WHEN TO APPLY

Apply as necessary to maintain control, waiting at least 7 days between each application.

GARDEN INSECTS CONTROLLED

On Ornamental Plants Including: Roses, Flowers, Shrubs and Small Trees

Aphid, armyworm, balsam woolly adelgid, buckhorn aphid, cabbage looper, cucumber beetle (adults—spotted & striped), cutworm, European pine sawfly, fall webworm, flea beetle, grasshopper, gypsy moth, imported cabbageworm, Japanese beetle, leafhopper, looper, Northern pine weevil, pine chafer, pine coreid bug, red pine sawfly, redheaded pine sawfly, saltmarsh caterpillar, spittlebugs, tent caterpillar, and whitefly.

On Listed Vegetables and Melons

Alfalfa caterpillar, alfalfa looper, aphid, armyworm, artichoke plume moth, beet armyworm, buckhorn aphid, cabbage looper, carrot weevil, celery looper, chinch bug, Colorado potato beetle, corn earworm, corn rootworm (adults), cowpea curculio, cucumber beetle (adults – spotted & striped), cutworm, diamondback moth, European corn borer, fleabeetle, grasshopper, green cloverworm, imported cabbageworm, leafhopper, looper, lygus bug, Mexican bean beetle, painted lady caterpillar, pea aphid, pea weevil, pepper weevil, pickleworm, potato leafhopper, potato psyllid, potato tuberworm, rindworm, saltmarsh caterpillar, sap beetle, Southwestern corn borer, squash bug, squash vine borer, stalk borer, stinkbug, tarnished plant bug, tobacco hornworm, tomato fruitworm, tomato hornworm, tomato pinworm, vegetable leafminer, velvetbean caterpillar, Western bean cutworm, and whitefly.

On Listed Berries and Small Fruit & Nut Trees

Apple aphid, black cherry aphid, codling moth, leafrollers, leafhoppers, green fruit worm, plant bugs, oblique banded leafroller, variegated leafroller, tentiform leafminer, San Jose scale (on fruit only), tufted apple budmoth, plum curculio, Oriental fruit moth, apple maggot, red-banded leafroller, lesser appleworm, rosey apple aphid, periodical cicada, pear psylla, pear slug, navel orangeworm, peach twig borer, filbert worm, peach tree borer, lesser peach tree borer, cherry fruit fly, American plum borer, pecan weevil, hickory shuckworm, pecan nut casebearer, pecan aphids, pecan spittlebug, pecan stem phylloxera, pecan leaf phylloxera, walnut aphid and walnut husk fly.

Manufactured for The ORTHO Group
P.O. BOX 190
Marysville, OH 43040
Form LBXOOOOOOOOX

EPA Reg. No. 1021-1582-239
EPA Est. 239-1A-3, 58996-MO-1A
Superscript is first letter of lot number
Made in USA

VEGETABLES	DAYS TO WAIT TO HARVEST
Artichoke	7
Broccoli	3
Cabbage	3
Carrots	7
Cauliflower	3
Collards	7
Cucumbers	3
Dry Beans	21
Dry Peas	21
Eggplant	7
Green Peas	3
Peppers	7
Potatoes	7
Pumpkin	3
Radishes	7
Snap Beans	3
Squash	3
Sweet Corn	1
Tomatoes	1

BERRIES & MELONS	DAYS TO WAIT TO HARVEST
Caneberries (blackberries, loganberries, red raspberries & black raspberries)	21
Elderberries	21
Gooseberries	21
Melons	3

SMALL FRUIT & NUT TREES (Such as container grown, dwarf or young trees)	DAYS TO WAIT TO HARVEST
Almond	21
Apple	21
Apricot	14
Cherries	14
Filberts	21
Nectarines	14
Peaches	14
Pecans	21
Pears	28
Plums	14
Prunes	14
Walnuts	21

NUISANCE PESTS CONTROLLED

Ants, cockroaches (including German and Asian cockroaches), crickets, palmetto bugs, sowbugs, pillbugs, spiders, and ticks that transmit Lyme disease.

HOW TO APPLY

NUISANCE PESTS: Apply directly to listed pests in outdoor areas.
OUTDOOR SURFACES: Spray buildings, porches, patios, garages, and other areas where bugs have been seen or are found. Do not spray near fishponds or other bodies of water.

WHEN TO APPLY

Apply as necessary to maintain control, waiting at least 7 days between each application.

People and pets may enter treated area after spray has dried.

Avoid contamination of food or feedstuffs.

No endorsement intended or implied

Colorado Potato Beetle Beater is a moderately hazardous pesticide.

1. True
2. False

False – Caution = slight hazard

Colorado Potato Beetle Beater should be applied before the pest is seen.

1. True
2. False

False

Page 4

WHEN TO APPLY

Apply when listed pests are present. Repeat applications may be made as indicated in the Home Gardens section. See your state extension service recommendations for treatment guidelines in your area.

HOME GARDENS

In the state of Georgia, do not apply this product to: Broccoli Raab, Chinese Cabbage (Bok Choy), Collards, Kale, Mizuna, Mustard Greens, Mustard Spinach, Rape Greens.

Colorado Potato Beetle Beater is approved for organic production so it is not harmful to the environment.

1. True
2. False

False

Page 8

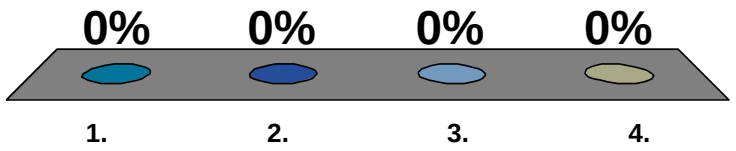
This product is toxic to aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

Physical or Chemical Hazards

Combustible. Do not use or store near heat or open flame.

How many tablespoons of Colorado Potato Beetle Beater should you add to a 3 gallon sprayer?

1. 2 Tbs
2. 4 Tbs
3. 6 Tbs
4. 12 Tbs



12 Tbs for 3 gallons of spray

Page 3

HOW TO MIX

Add the required amount of this product to the recommended amount of water, mix thoroughly, and apply uniformly to both upper and lower surfaces of plant foliage. It is recommended to mix only as much spray as needed for a single treatment. In vegetable gardens it is recommended to use not more than 3 gallons of spray for 1000 sq ft of area. Do not use kitchen utensils for measuring. Keep measuring utensils with product and away from children.

Unit of Measure*	Amount of this product to Use per Pint, Quart or Gallon of Spray		
	Per Pint (16 fl oz) of Spray	Per Quart (32 fl oz) of Spray	Per Gallon (128 fl oz) of Spray
Fluid Ounces (fl oz)	0.25 fl oz	0.5 fl oz	2.0 fl oz
Milliliters (mL)	7.5 mL	15 mL	60 mL
Tablespoons (Tbs)	½ Tbs	1 Tbs	4 Tbs
Teaspoons (tsp)	1 ½ tsp	3 tsp	12 tsp

* Conversion factors: 1 fl oz = 30 mL= 2 tablespoons (Tbs) = 6 teaspoons (tsp) (1 teaspoon = 1/3 tablespoon)

HOW TO APPLY

Colorado Potato Beetle Beater is a good choice for treating asparagus spears for asparagus beetle damage

1. True
2. False

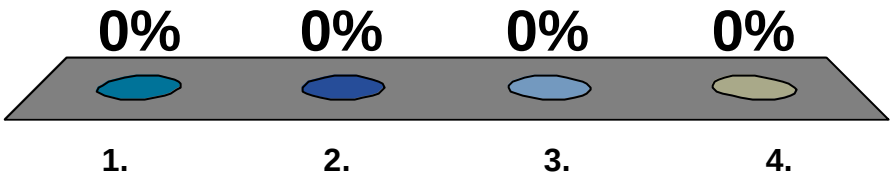
False – may only treat post harvest

Page 4

Crops	Pests Controlled	Maximum Number of Applications per Season	Minimum Days to Wait before Reapplying	Minimum Days to Wait from Last Application to Harvest
apple and other pome fruits including crabapples, mayhaw, pears, and quince	codling moth, leafminers, leafrollers, Oriental fruit moth, tufted apple budmoth	6	10	7
asparagus (post-harvest to protect ferns)	asparagus beetles	4	7	60
bushberries and caneberries, including blackberry, blueberry, currant, elderberry, gooseberry, huckleberry, juneberry, lingonberry, loganberry, raspberry, and salal	armyworms, fireworms, fruitfly (suppression), fruitworms, leafrollers, loopers, thrips	6	6	3

What protective equipment **must** be worn when mixing Colorado Potato Beetle Beater?

1. goggles
2. gloves
3. long pants & long sleeves
4. None of these



Nothing is required… But

Page 8

PRECAUTIONARY STATEMENTS

Environmental Hazards

This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

Physical or Chemical Hazards

Combustible. Do not use or store near heat or open flame.

Purchase wisely

- Measure the area needing treatment
- Only purchase what you need “right now”
- Check the label for:
  - re-entry
  - site & pest
  - days to harvest
  - personal protective equipment needs

Prepare for the application

- Read the label
- Wear all PPE
- Mix carefully
- More is NOT better
- Never use more than the label directs

Apply properly & be cautious

- Only treat infested areas
- Spot treatments conserve beneficial organisms
- Avoid broadcast treatments
- Keep the plant's condition in mind
- Check coverage & monitor control
- Only repeat application if the label allows

Why treat the whole tree?

Dogwood borer on apple

Why treat the whole tree?

Eastern tent caterpillar

Broadcast applications

- Broadcast applications of lawn herbicides can cause weird results

- Broadcast applications of any pesticide are prohibited within 25 feet of any wetland or water body

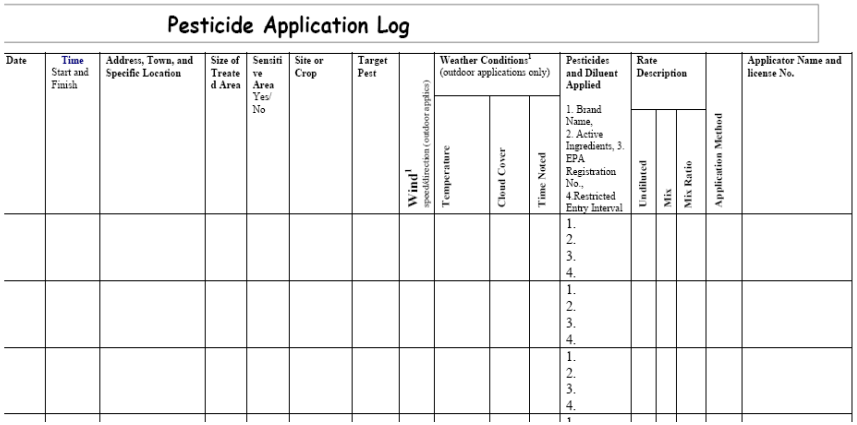
If you must apply a pesticide

- Wait long enough for the product to work
- Examples

No endorsement intended or implied

If you must apply a pesticide

- Keeps records of what was used and how well it worked
- Review your records before treating again next season

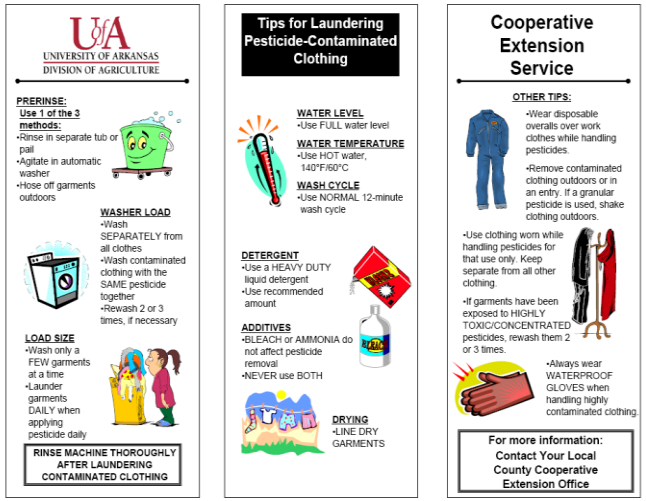


Pesticide Application Log

Date	Time Start and Finish	Address, Town, and Specific Location	Size of Treated Area	Sensitive Area Yes/No	Site or Crop	Target Pest	Wind[1] speed/direction (outdoor applics)	Weather Conditions[1] (outdoor applications only)			Pesticides and Diluent Applied	Rate Description			Application Method	Applicator Name and license No.
								Temperature	Cloud Cover	Time Noted	1. Brand Name, 2. Active Ingredients, 3. EPA Registration No., 4.Restricted Entry Interval	Undiluted	Mix	Mix Ratio		
											1. 2. 3. 4.					
											1. 2. 3. 4.					
											1. 2. 3. 4.					

If you must apply a pesticide

- Clean yourself and you equipment
- Apply rinse water to the application site
- Wash contaminated clothing separately



UofA
UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

PRERINSE:
Use 1 of the 3 methods:
- Rinse in separate tub or pail
- Agitate in automatic washer
- Hose off garments outdoors

WASHER LOAD
- Wash SEPARATELY from all clothes
- Wash contaminated clothing with the SAME pesticide together
- Rewash 2 or 3 times, if necessary

LOAD SIZE
- Wash only a FEW garments at a time
- Launder garments DAILY when applying pesticide daily

RINSE MACHINE THOROUGHLY AFTER LAUNDERING CONTAMINATED CLOTHING

Tips for Laundering Pesticide-Contaminated Clothing

WATER LEVEL
- Use FULL water level

WATER TEMPERATURE
- Use HOT water, 140°F/60°C

WASH CYCLE
- Use NORMAL 12-minute wash cycle

DETERGENT
- Use a HEAVY DUTY liquid detergent
- Use recommended amount

ADDITIVES
- BLEACH or AMMONIA do not affect pesticide removal
- NEVER use BOTH

DRYING
- LINE DRY GARMENTS

Cooperative Extension Service

OTHER TIPS:
- Wear disposable overalls over work clothes while handling pesticides.
- Remove contaminated clothing outdoors or in an entry. If a granular pesticide is used, shake clothing outdoors.
- Use clothing worn while handling pesticides for that use only. Keep separate from all other clothing.
- If garments have been exposed to HIGHLY TOXIC/CONCENTRATED pesticides, rewash them 2 or 3 times.
- Always wear WATERPROOF GLOVES when handling highly contaminated clothing.

For more information: Contact Your Local County Cooperative Extension Office

You must wait 10 days before re-applying Colorado Potato Beetle Beater to apples.

1. True
2. False

True

Page 4

HOME GARDENS

In the state of Georgia, do not apply this product to: Broccoli Raab, Chinese Cabbage (Bok Choy), Collards, Kale, Mizuna, Mustard Greens, Mustard Spinach, Rape Greens.

Crops	Pests Controlled	Maximum Number of Applications per Season	Minimum Days to Wait before Reapplying	Minimum Days to Wait from Last Application to Harvest
apple and other pome fruits including crabapples, mayhaw, pears, and quince	codling moth, leafminers, leafrollers, Oriental fruit moth, tufted apple budmoth	6	10	7
asparagus (post-harvest to protect ferns)	asparagus beetles	4	7	60

It is appropriate to use Colorado Potato Beetle Beater if you will be selling your produce.

1. True
2. False

False

Pages 2 & 3

COLORADO POTATO BEETLE BEATER CONCENTRATE

• DO-IT-YOURSELF HOME GARDEN INSECT CONTROL.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

For residential use in home gardens, lawns and ornamentals. Not for use on plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes.

Colorado Potato Beetle Beater is best applied to apple trees just as they reach full bloom.

1. True
2. False

False

Page 8

PRECAUTIONARY STATEMENTS

Environmental Hazards

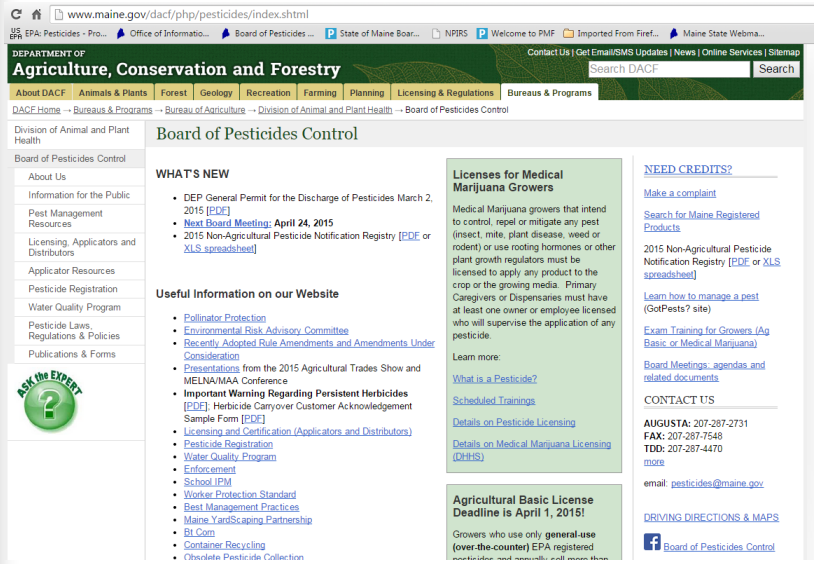
This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

Physical or Chemical Hazards

Combustible. Do not use or store near heat or open flame.

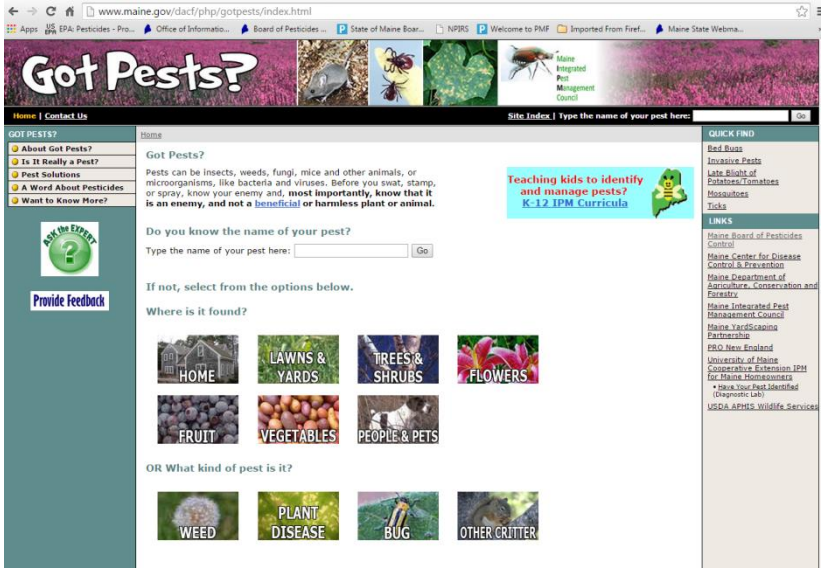
Who you gonna call?

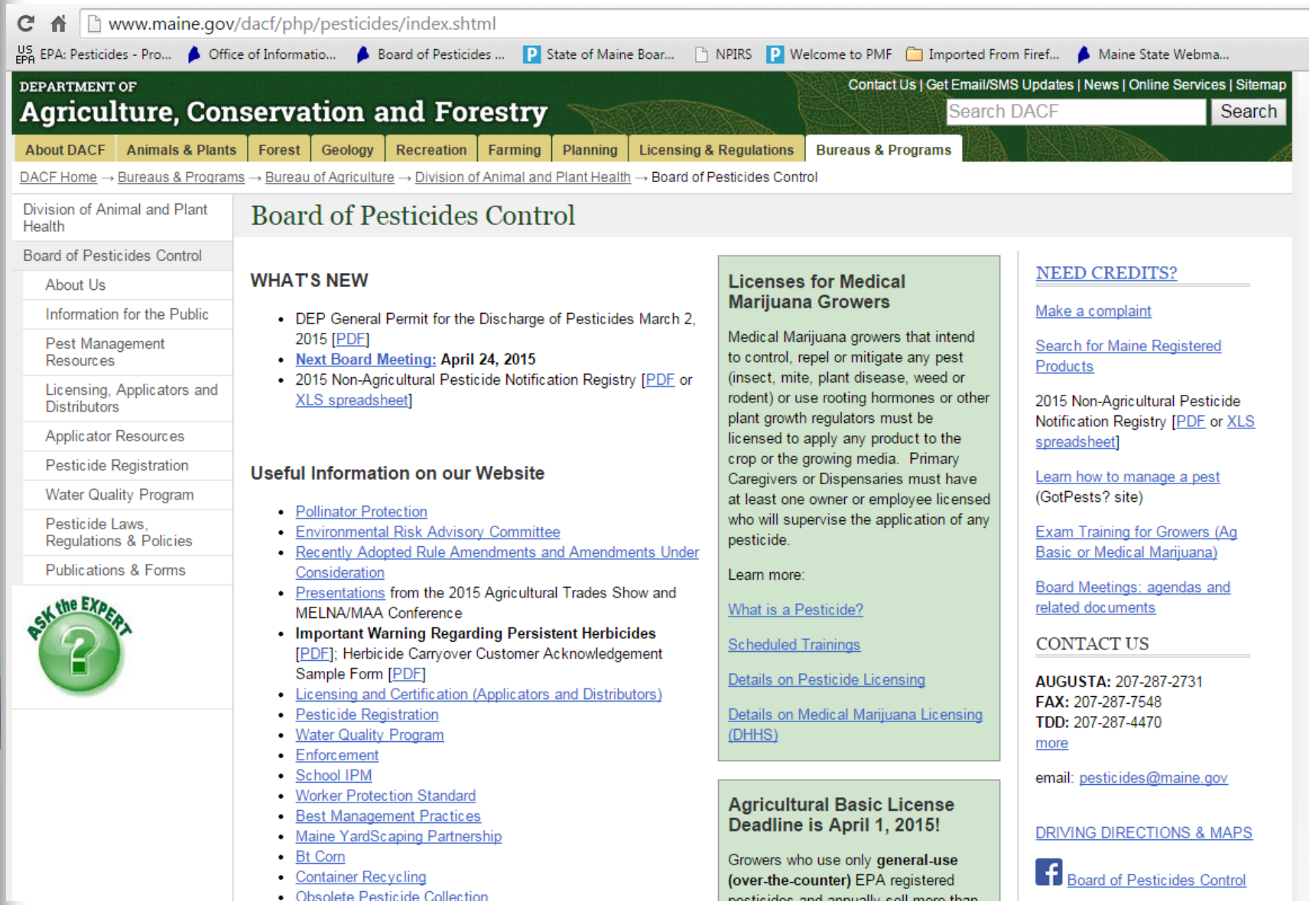
BPC Web Pages



www.thinkfirstspraylast.org

www.gotpests.org

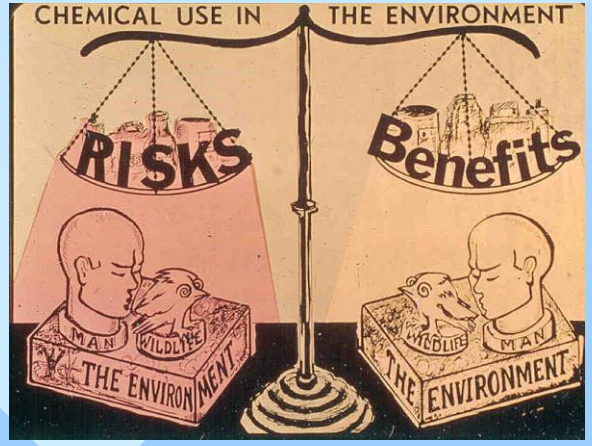




www.thinkfirstspraylast.org

Summary

- Risk = Toxicity x Exposure
- All pesticides have risks
- Reduce risks - wear PPE
- Make the benefits outweigh the risks



Please rate this presentation

1. Wow
2. Helpful
3. Ho Hum
4. Crap
5. Bull Crap