Home Pesticide Use Risks & Benefits

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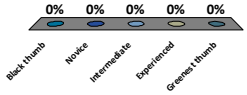
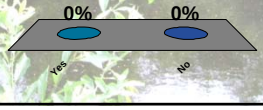
Which type of gardener are you?

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



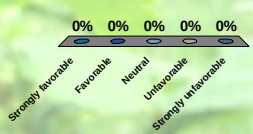
Have you ever heard of the Board of Pesticides Control (BPC)?

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

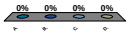
Unfortunately, a not so uncommon result from our use of pesticides

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. 

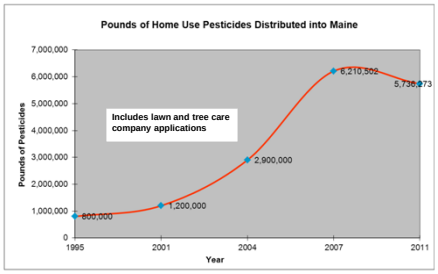
No endorsement intended or implied



Maine pesticide use more common than perceived

No endorsement intended or implied

Have we finally hit the top of the curve?



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?

- **Wintergreen oil –**
  - **highly toxic,**
  - **not recommended during pregnancy,**
  - **causes dermatitis,**
  - **inhalation hazard**
- **Cinnamon oil –**
  - **powerful irritant and**
  - **even worse sensitizer**

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 **UNSAFE** when it is either taken by mouth or applied directly to the skin 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.

  Pregnancy and breast-feeding: Eucalyptus seems to be safe for pregnant and breast-feeding women when used in food amounts. But don't use eucalyptus oil. Not enough is known about safety during pregnancy or breast-feeding.

  Children: Eucalyptus oil is **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.

What products are NOT pesticides?

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

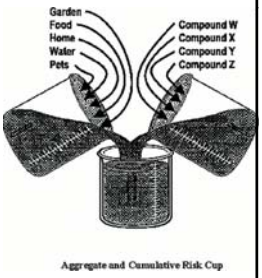
No endorsement intended or implied

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



After 1996 FQPA

What are the benefits?


- Aesthetics

- Healthy saleable plants & produce

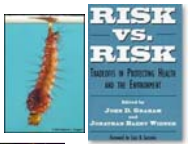

What are the benefits?

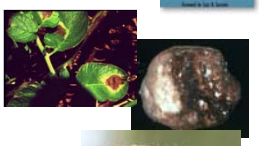

- Bountiful harvest

- Nuisance or public heath pest control

Risk vs. Risk

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



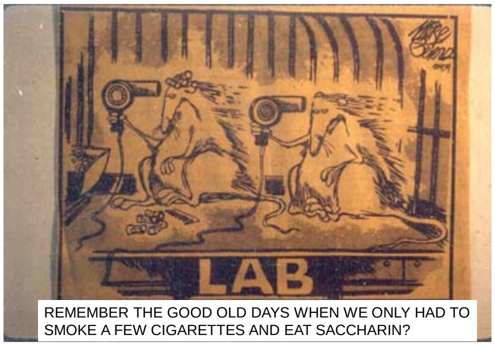



What are the human risks?

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

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

How are the risks determined?



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

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.

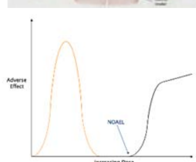
"All substances are poisons; there is none which is not a poison. The right DOSE differentiates a poison from a remedy."

–Paracelsus (1493-1541)

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

Endocrine effects

- EPA is just beginning to do endocrine disrupter screening for pesticide active and inert ingredients
- http://www.epa.gov/scipoly/oscpendo/index.htm
- http://www.epa.gov/scipoly/oscpendo/pubs/final_list_frn_041509.pdf
- 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

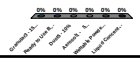
Warning

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

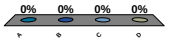
Best

Worst

Which product do you think is the better choice?

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

No endorsement intended or implied



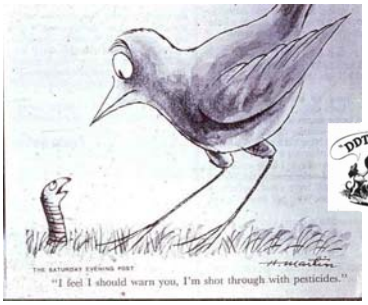
How is risk reduced?- PPE

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 persistent products were cancelled
- Pollinators are now a focus area

http://www.extension.org/pages/24315/managed-pollinator-cap:-coordinated-agricultural-project

Multiple Universities' Pollinator Project

- The answers are only beginning to emerge, but current research has revealed some results
  - Mites and viruses appear to be the main culprits along with the mite controls
    - Fungicides may exacerbate Nosema disease
  - For honey bees low levels of pesticides have been shown to reduce associative learning of individual bees in laboratory studies
    - These changes in learning and behavior can potentially alter normal colony level functions, yet colony-level impacts remain to be verified
  - 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

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

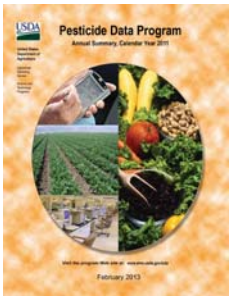
Eric Mader – The Xerces Society for Invertebrate Conservation

Pesticide residues are found on all types of food

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

2011 USDA-PDP Sampling

- USDA – PDP 2011 sampling shows that 99.73% of all samples are well below the tolerances set by EPA
- In baby food no residues were found above the tolerance levels
- 399 (3.4%) of samples contained extremely low levels of pesticides for which there is no tolerance
- "The data reported by PDP corroborate that residues found in fruits and vegetables are at levels that do not pose risk to consumers' health"



http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=stelprdc5102692

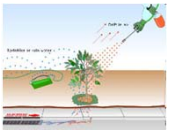
PDP also detects pesticide residues on organic produce

- **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**
- **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

Home pesticide use - Worst case

Groundwater monitoring results

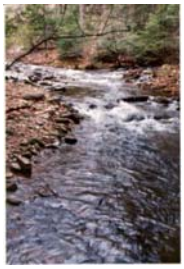
Commodity Group	Number of Samples Collected			Number of Samples with Positive Detections			Percent of Samples with Positive Detections			Detections Above a Health Advisory		
	1994	1999	2005	1994	1999	2005	1994	1999	2005	1994	1999	2005
Potatoes	47	100	87	8	4	1	17%	4%	1%	None	None	None
Corn	49	51	28	7	0	4	14%	0%	14%	None	None	None
Blueberries	21	22	13	15	13	7	75%	59%	54%	None	None	None
Small Grains	3	9	17	0	0	1	0%	0%	6%	None	None	None
Orchards	1	5	3	1	0	0	100%	0%	0%	✱ One	None	None
Christmas Trees	5	4	3	0	0	0	0%	0%	0%	None	None	None
Strawberries	None	3	6	---	0	0	---	0%	0%	---	None	None
Totals:	**129**	**194**	**157**	**31**	**17**	**13**	**23.3%**	**9.0%**	**8.3%**	---	---	---

*Homeowner application of diazinon to control ants – 10x over MCL

Groundwater monitoring results

- We sampled wells near blueberry fields in 2011
  - the number of wells with detections dropped to 38%
  - 2 different herbicides found
    - hexazinone
    - terbacil

Pesticides Can Run-off Into Surface Waters



BayScaping Project

- Friends Of Casco Bay did some detective work in 2001, 2002, 2003, 2005, 2006, 2008 and 2009
- Sampled runoff water from intensive lawn care areas in Cumberland, S Portland, Westbrook, Falmouth, Yarmouth, Brunswick, Freeport, Portland and Cape Elizabeth & Back Cove area

Friends of Casco Bay Sampling

– 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

**Values in red exceed Aquatic Life Criteria

– Pesticide residues detected in sediments

- Bifenthrin up to (37 ppb)
- Permethrin up to (47 ppb)

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!

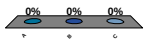
Disposal

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

Which product is most risky to handle?

1. A →
2. B
3. C →

No endorsement intended or implied



Think First…. Spray Last

- "The quick fix is neither"!

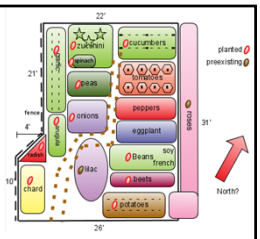
Make the benefits

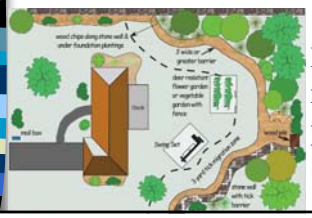
Outweigh the risks

1997 Legislative Mandate

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

Look at the big picture





Make plans to manage specific problems

Do you need a pesticide?

- First identify the pest
- Is it *really a problem*
- Try cultural or sanitary controls
- Encourage the "Good bugs"
- Replace with resistant varieties

Diagnosis murder??

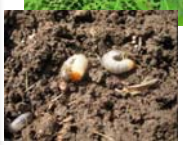
- Is it a pest problem?
  - Often what's normal for the plant is mistaken for a pest or disease
    - Variegation
    - Reproductive structures

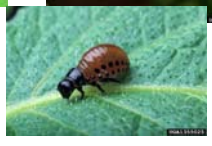
Who's been chewing here?

They only come out at night!

Fruit Drop!

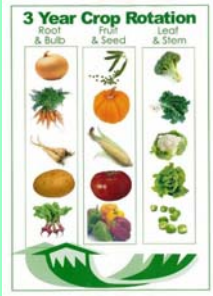
"The gardener's best buddies"





Colorado potato beetle

- Cultural controls
  - **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©

Japanese Beetle

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

Kentucky wonder pole beans

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	Canela
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/

Cultural controls

- **Plant health and cultural requirements**
  - **fertilization: over fertilization (the "aphid effect")**
    - **Overfertilizing may help the pest more than the plant**
  - **water management: proper irrigation**
  - **planting site: choose the right plant for the site**
  - **mulching: pull mulch away from the trunk to decreases pest/ disease potential**
- **Sanitation: removing diseased vegetation from garden (rogueing)**

Cultural controls – Late Blight

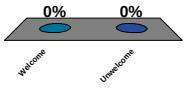
- Do not keep cull piles of potatoes
- Do not save questionable potato seed
- Do not compost diseased tubers, because parts of the compost pile may not be hot enough to kill the tubers, providing the pathogen with living tissue for overwintering
- Buy seed from a good source
- In the spring, scout, pull and destroy all volunteer potatoes

Mechanical controls

- Exclusion by screens, barriers
- Pruning infested plants
- Hand removal
- Shake & capture

Welcome or Unwelcome?

1. Welcome
2. Unwelcome



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

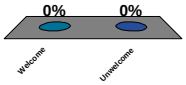
Istocheta* (=*Hyperecteina*) *aldrichi
Introduced into US from Japan in 1922
Adults emerge Late June/July, feed on honeydew, nectar
- **Lay up 100 eggs in two weeks**
- **Eggs hatch 1 day later, dig into beetle**
- **Kills beetle in 5-6 days**
- **Just before death, beetle digs into ground where fly 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?

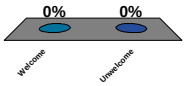
1. Welcome
2. Unwelcome



Ladybird beetles eat pests as adults and larvae

Welcome or Unwelcome?

1. Welcome
2. Unwelcome



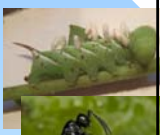
Flower fly larvae eat aphids!

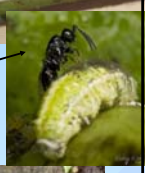
Science fiction monster?

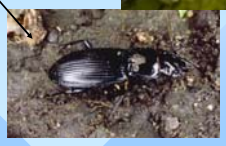
Delicate beauty – Green lacewing

Spare the Sprays to Protect Beneficial Insects

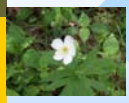
- Dragonflies
- Spiders
- Small parasitic wasps
- Predatory mites
- Syrphid flies
- Ground beetles







Habitat enhancement for beneficials



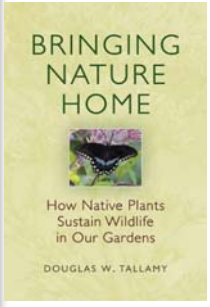
Many beneficials, as adults, larvae, or both, require pollen and/or nectar as dietary supplements

Key is to provide a series of plants that, collectively, provide continuous nectar/pollen supply

Many of the same plants that provide food and habitat for natural enemies also provide resources for pollinators

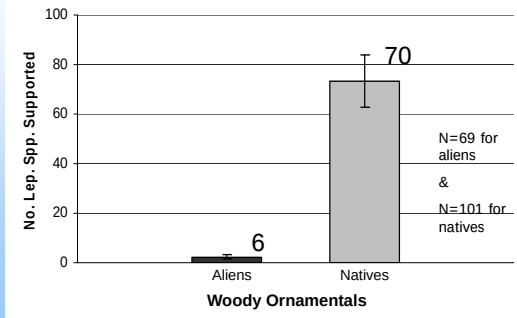
Bloom Timing of Native Plants Attractive to Beneficial Insects

Birds can also be our allies



http://www.bringingnaturehome.net/

On average natives support 12x more lepidopteran species



Pretty ornamentals? Or Pests?

Who you gonna call?

BPC Web Pages

www.thinkfirstspraylast.org

www.gotpests.org

Do you need a pesticide?

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

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

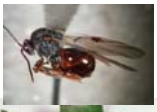
Timing and hitting the target is everything?

What is the threshold for control!

- Potato flea beetles
- 15 shot holes in a leaf
- Must stop them early
- Row covers can help

Nobody home!

Eriophyid gall mite



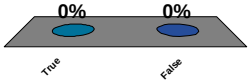
Oak apple gall wasp

The key to proper use

- Read the label!

Colorado Potato Beetle Beater is a moderately hazardous pesticide.

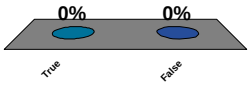
1. True
2. False



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

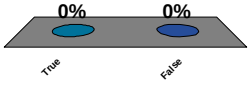
Apply when listed pests are present. Repeat applications may be made as indicated in the Home Gardens section. See your state extension service recommendations for treatment guidelines in your area.

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

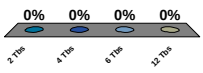
This product is toxic to aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or 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.

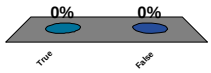
	Amount of this product to Use per Pint, Quart or Gallon of Spray		
Unit of Measure*	Per Pint (16 fl oz) of Spray	Per Quart (32 fl oz) of Spray	Per Gallon (128 fl oz) of Spray
Fluid Ounces (fl oz)	0.25 fl oz	0.5 fl oz	2.0 fl oz
Milliliters (mL)	7.5 mL	15 mL	60 mL
Tablespoons (Tbs)	½ Tbs	1 Tbs	4 Tbs
Teaspoons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



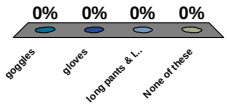
False – may only treat post harvest

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

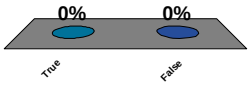
This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. To protect the environment, 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.

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.

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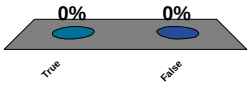
asparagus (post-harvest to protect ferns)	asparagus beetles	4	7	60

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.

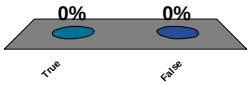
DIRECTIONS FOR USE

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

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Physical or Chemical Hazards

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

The old days

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

No endorsement intended or implied

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

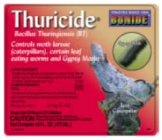
Broadcast applications

- 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

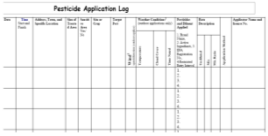
- Wait long enough for the product to work
- Examples



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



If you must apply a pesticide

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

YardScaping…

for a healthy Maine

The YardScaping Partnership

- Allen, Sterling & Lothrop
- Bar Mills Ecological
- Breakwater School
- Carroll Associates, Landscape Architects
- Casco Bay Estuary Partnership
- City of Portland
- Congress of Lake Associations
- Friends of Casco Bay
- Friends of Scarborough Marsh
- Gnome Landscapes, Design & Masonry
- Jacobs Edwards and Kelcey
- Kennebunkport Conservation Commission
- LakeSmart Program
- Libby's Landscaping and Greenhouse
- Lisa Cowan, studioverde landscape architecture + design
- Maine Board of Pesticides Control
- Maine Department of Agriculture
- Maine Department of Environmental Protection
- Maine Landscape & Nursery Association
- Maine Organic Farmers & Gardeners Association
- Maine Soil & Water Conservation Districts
- Maine State Planning Office
- Maine Volunteer Lake Monitoring Program
- Natural Resources Conservation Service
- New England Organics
- O'Donal's Nurseries
- PJC & Company Ecological Land Care
- Portland Trails
- Shaw Brothers Construction
- Skillin's Greenhouses
- Southern Maine Community College
- Think Blue Maine Program
- Town of Brunswick
- University of Maine Cooperative Extension

The Partnership is very diverse!

www.yardscaping.org

for a healthy Maine

YardScaping

- A new paradigm?
- Some call it “Sustainable Landscaping” or “Ecological Landscaping”
- We want to keep it simple
- http://youtu.be/cwaSKjymQDc

YardScaping Mission

- YardScaping hopes to inspire Maine people to create and maintain healthy landscapes through ecologically based practices that minimize reliance on water, fertilizer and pesticides.

The Ten-ets of YardScaping

- Promote buffers
- Promote appropriate plants - native plants and non-invasive alien plants
- Reduce lawn area
- Reduce runoff
- Reduce reliance on pesticides, fertilizers and water
- Promote low input lawns and landscapes
- Promote YardScape diversity
- Create wildlife habitats
- Right plant, right place, right use
- Commonsense pest management (IPM)

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

Where to learn more

www.yardscaping.org/plants/index.htm

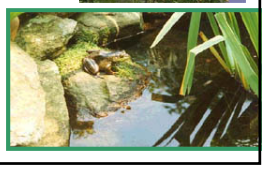
Use a diversity of plants & grasses

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

Create wildlife habitats

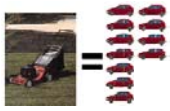
Diversity and plant layers go hand in hand with habitat creation

- Add nectar and fruit producing plants
- Strive for continuous blooms
- Add water, walls, feeders, woody debris



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

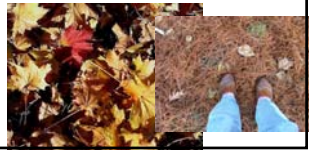
Mowers spew 87 lbs of greenhouse gases and 40 pounds of other pollutants annually

Use low input plant varieties

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

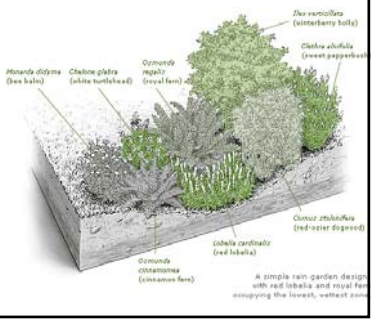
Protect lakes & streams with buffers

- 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



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

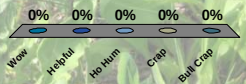
Sweet Fern

Use common sense pest management

- Integrated pest management
  - Know your pest
  - Pick it, trap it or exclude it
  - Know the good bugs
  - Mow, prune or water
  - Use pesticides as last resort

Please rate this presentation

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



Summary

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