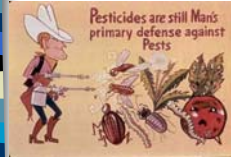


## Home Pesticide What Everyone Should Know



- Gary Fish  
 Maine Board of Pesticides Control  
 28 State House Station  
 Augusta ME 04333-0028  
 (207)287-2731  
 gary.fish@maine.gov



How we see ourselves using pesticides



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



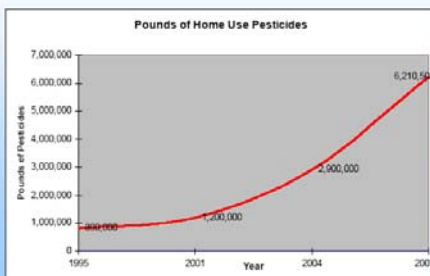
Even in Canada people still rely on pesticides



Maine pesticide use more common than perceived



Dramatic 7x increase in pesticide use in 12 years!



What is a pesticide?



- Any substance intended for preventing, destroying, repelling or mitigating any pest;
- Not including multicellular pest control agents such as predatory insects.



## What are pesticides?

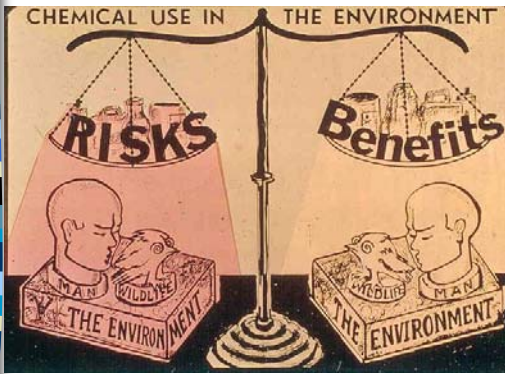


- Bleaches, *Lysol*, pine oil
- Weed & Feed, *Roundup*
- Rat & mouse baits
- Rose disease control

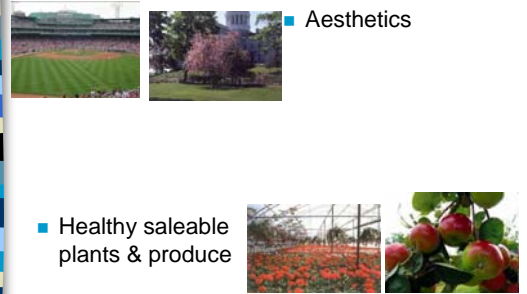
## What are Pesticides?



- “Organics” like pyrethrum
- Bio-pesticides
- Wood preservatives
- Plant incorporated protectants

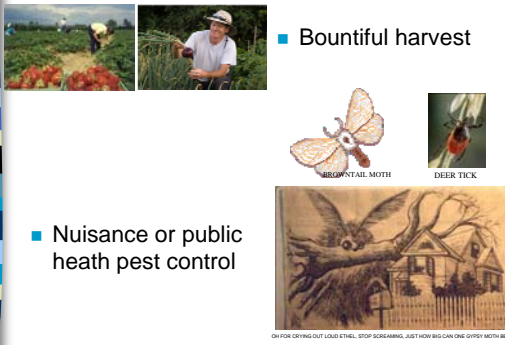


## What are the benefits?



- Aesthetics
- Healthy saleable plants & produce

## What are the benefits?



- Bountiful harvest
- Nuisance or public health pest control

## Risk vs. Risk

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





“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 'Tall Tom' War for a WV contest death

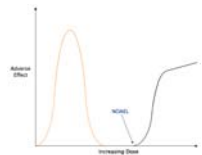
**Water intoxication**  
 A woman who competed in a water-drinking contest died after drinking about 100 gallons of water in 10 hours, according to a coroner's report.

**Water intoxication**  
 The woman, 28, died from water intoxication after competing in a water-drinking contest in West Virginia. She drank about 100 gallons of water in 10 hours.

**Water intoxication**  
 The woman died from water intoxication after competing in a water-drinking contest in West Virginia. She drank about 100 gallons of water in 10 hours.

## 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\\_fm\\_041509.pdf](http://www.epa.gov/scipoly/oscpendo/pubs/final_list_fm_041509.pdf)
- Does the dose make the poison?? What about hormesis?
- <http://www.belleonline.com/index.htm>



**RESTRICTED USE PESTICIDE**  
 KEEP OUT OF REACH OF CHILDREN  
 DANGER - POISON  
 PELIGRO

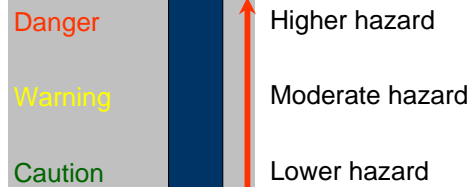
**TEMIK® Original 15G ALDRIN PESTICIDE**  
 Bayer CropScience

**F I S X**

**DAD LOCK!**

## One way to quickly assess the risk?

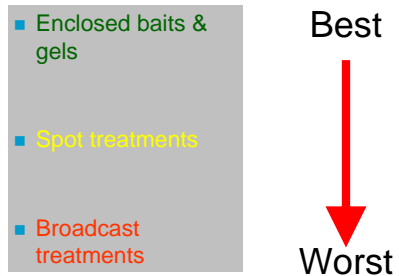
### Signal Words



## Pesticide exposure potential

Formulation Type	% Active Ingredient
Granular	3 - 15%
RTU Baits, Gels or Liquids	1 - 15%
Dust	5 - 10%
Aerosol	1 - 5%
Wettable Powder	50 - 85%
Liquid Concentrate	40 - 90%

## Reduce exposure by using targeted materials

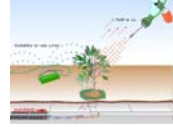


## How is risk reduced?- PPE



## 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 75°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
<b>Totals:</b>	<b>129</b>	<b>194</b>	<b>157</b>	<b>31</b>	<b>17</b>	<b>13</b>	<b>23.3%</b>	<b>9.0%</b>	<b>8.3%</b>	<b>---</b>	<b>---</b>	<b>---</b>

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

## Pesticides Can Run-off Into Surface Waters



## BayScaping Project

- Friends Of Casco Bay did some detective work in 2001, 2002, 2003, 2005, 2006 & 2008
- 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 (16.6 ppb)

## Aquatic Life Effects

- Aquatic life criteria proposed by various sources for fresh water (from EPA & USGS Fact Sheet 097-99)
  - 2,4-D – 4 ppb
  - MCPA – 2.6 ppb
  - Carbaryl – 0.02 ppb
  - Dicamba – 10 ppb
  - Diazinon – 0.1 ppb
  - Chlorpyrifos – 0.001 ppb
- California study found bifenthrin in 80% of sediment samples at levels toxic to aquatic invertebrates (437 ppb)
- Also found it at a concentration 15 times greater than in the sediments of creeks running through agricultural lands (from Environmental Science & Technology Dec. 15, 2005)



## 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)

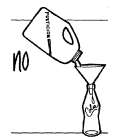
## Prevent water contamination

- 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 of each of 60 days and avoid...  
Disposal in area where temperatures frequently exceed 100°F

**Disposal**  
Do not reuse this container.  
Place empty containers in a safe place for recycling if available.  
**If Partly Full:**  
Call your local waste management or call 1-800-CLEANUP for disposal instructions.  
\*Never place unused product down any drain or outside drain.




## 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”



## 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

- 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 decrease pest/disease potential
- Sanitation: raking leaves to reduce fungi



## Mechanical controls

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



## Biological Controls

Good bug or bad bug?



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

*Istocheta* (=Hyperrecteina) *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



We love the good “bugs!”



Good Bug? Or Bad?



Friend? Or Foe?



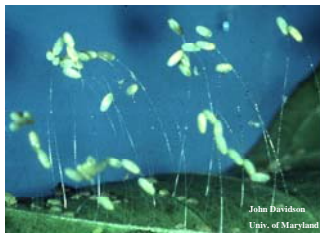
## Science fiction monster?



## Delicate beauty



## Omelet on a stick?



John Davidson,  
Univ. of Maryland

## 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

Native plant	Natural enemies	Bees	Bloom Period						
			May	Jun	Jul	Aug	Sep	Oct	
wild strawberry	**	*							
golden Alexanders	***	**							
Canada anemone	***	*							
pentstemon	**	**							
angelica	***	*							
cow parsnip	***	*							
sand coreopsis	***	*							
shrubby cinquefoil	***	*							
Indian hemp	***	*							
late hysop	**	**							
swamp milkweed	**	**							
Culver's root	**	***							
yellow coneflower	**	**							
nodding wild onion	*	**							
meadowweet	***	*							
yellow giant hyssop	**	***							
horsemint	***	**							
Missouri ironweed	**	**							
cup plant	***	***							
pale Indian plantain	**	**							
boneset	**	**							
blue lobelia	***	***							
pale-leaved sunflower	***	**							
Rudbeck's goldenrod	**	**							
New England aster	***	**							
smooth aster	**	**							



## Pretty ornamentals? Or Pests?



## Who you gonna call?



**PESTICIDE REGULATIONS**  
Maine Board of Pesticides Control  
(207) 287-2379

**PEST PROBLEMS**  
Cooperative Extension  
(800) 287-4279  
Maine Forest Service  
(207) 287-2431

**PESTICIDE PATENTING**  
Northern New England Pesticide Center  
(603) 252-1222

## BPC Web Pages



[www.thinkfirstspraylast.org](http://www.thinkfirstspraylast.org)



[www.gotpests.org](http://www.gotpests.org)

## 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?



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



## Timing and hitting the target is everything?



## What life stage can be controlled!

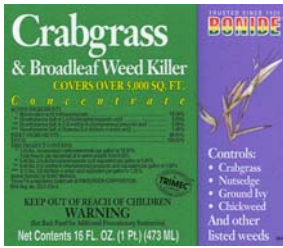


## Nobody home!



## The key to proper use

- **Read the label!**



## The old days



## Great directions!



## Today's label





## Why treat the whole tree?



## If you must apply a pesticide

- Avoid broadcast treatments
- Keep the plant's condition in mind
- Check coverage & monitor control
- Only repeat application if the label allows



## Broadcast lawn applications can impact vegetable and fruit plants



## If you must apply a pesticide

- Apply when conditions are good
  - wind
  - rain
  - heat



## If you must apply a pesticide

- Wait long enough for the product to work
- Examples



## 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

Date	Time	Area Treated	Pesticide Name	Rate	Weather	Wind	Temp	Humidity	Notes

## 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 Maine YardScaping Partnership

- Allen, Sterling & Lothrop
- Bar Mills Ecological
- Carroll Associates, Landscape Architects
- City of Portland
- Congress of Lake Associations
- Edwards & Kelcey
- Friends of Casco Bay
- Friends of Scarborough Marsh
- Kennebunkport Conservation Commission
- LakeSmart Program
- Lisa Cowan, Landscape Architecture
- Maine Board of Pesticides Control
- Maine Department of Agriculture
- Maine Department of Environmental Protection
- Maine Landscape/Nursery Association
- Maine Organic Farmers & Gardeners Association
- Maine Society of Landscape Architects
- Maine Storm Water Groups
- Maine Volunteer Lake Monitoring Program
- Natural Resources Conservation Service
- O'Donal's Nurseries
- Shaw Brothers Construction
- Skillin's Greenhouses
- Soil & Water Conservation Districts
- Southern Maine Community College
- State Planning Office
- Think Blue Maine Program
- Town of Brunswick
- University of Maine Cooperative Extension

The Partnership is very diverse!



## YardScaping

- A new paradigm?
- Some call it "Sustainable Landscaping" or "Ecological Landscaping"
- We want to keep it simple



## YardScaping Mission

- 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

- Use site appropriate, non-invasive plants
- Right plant, right place, right purpose
- Use diversity of plants & grasses
- Create wildlife habitats
- Reduce lawn area
- Use low input lawns & landscapes
- Use vegetative buffers to protect surface waters
- Reduce runoff
- Reduce reliance on pesticides, fertilizers and water
- Promote sensible 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



Wild Columbine



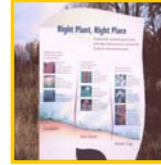
Viburnum Leaf Beetle



Oriental Bittersweet

## Right plant, right place, right purpose

- Choose plants based on the area to be planted 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

## Right plant, right place



Common Ninebark  
– dry sunny site



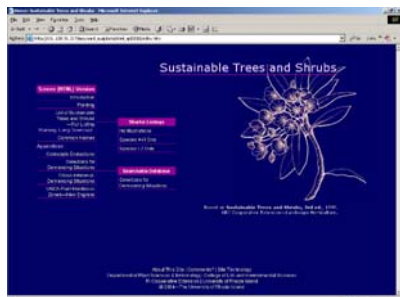
Cinnamon Fern  
– wet shady site



Smooth Sumac –  
large open dry bank

<http://orb.at.ufl.edu/TREES/index.html>

## Where to learn more



[http://www.pse.uri.edu/maynard\\_susplants/html\\_spl2000/](http://www.pse.uri.edu/maynard_susplants/html_spl2000/)

## 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

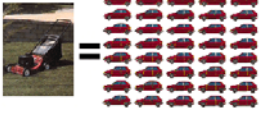
Diversity and plant layers go hand in hand with habitat creation

- 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 = 40 small cars' exhaust



## Use low input plant varieties

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



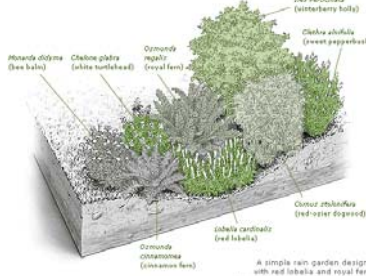
## Protect lakes & streams with buffers

- Preserve existing landscape
- Winding paths
- Don't mow to the lake'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
  - Pick it, trap it or exclude it
  - Know the good bugs
  - Mow, prune or water
  - Use pesticides as last resort



## Summary

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

