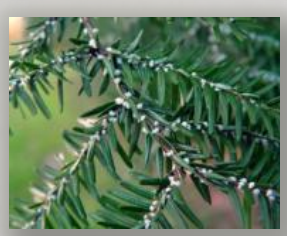
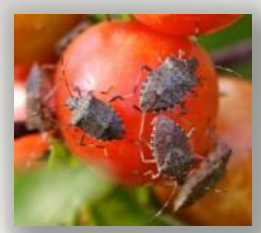
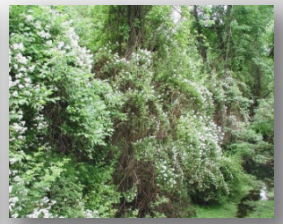






MAINE'S MOST UNWANTED




Maine Department of Agriculture, Conservation and Forestry - BPC Trainings 2014

What are invasive species?

- Are not naturally found in the area
- Cause harm to:
  - environment
  - economy
  - human health
- Any benefits are outweighed by harm

Japanese Barberry, CTAES

Most non-native (alien) species are not invasive

Spotted Wing Drosophila (SWD)

Drosophila suzukii

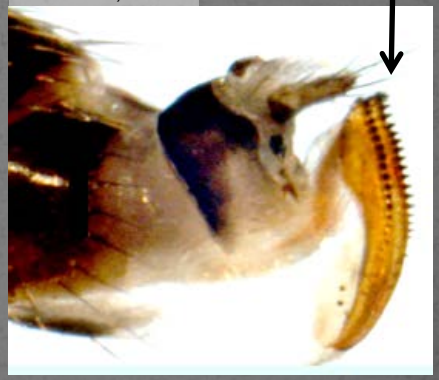
Vinegar Fly

Attacks ripening fruit

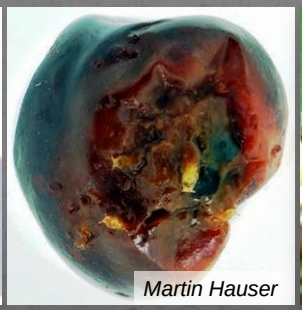
- Prefers soft-skinned fruit
  - blueberry, blackberry, cherry, grape, peach, plum, raspberry, strawberry…
- Will attack harder fruits if skin is broken
  - apple, pear, tomato, kiwi…

G. Arakelian

M. Hauser, CDFA




BC Ministry of Agriculture

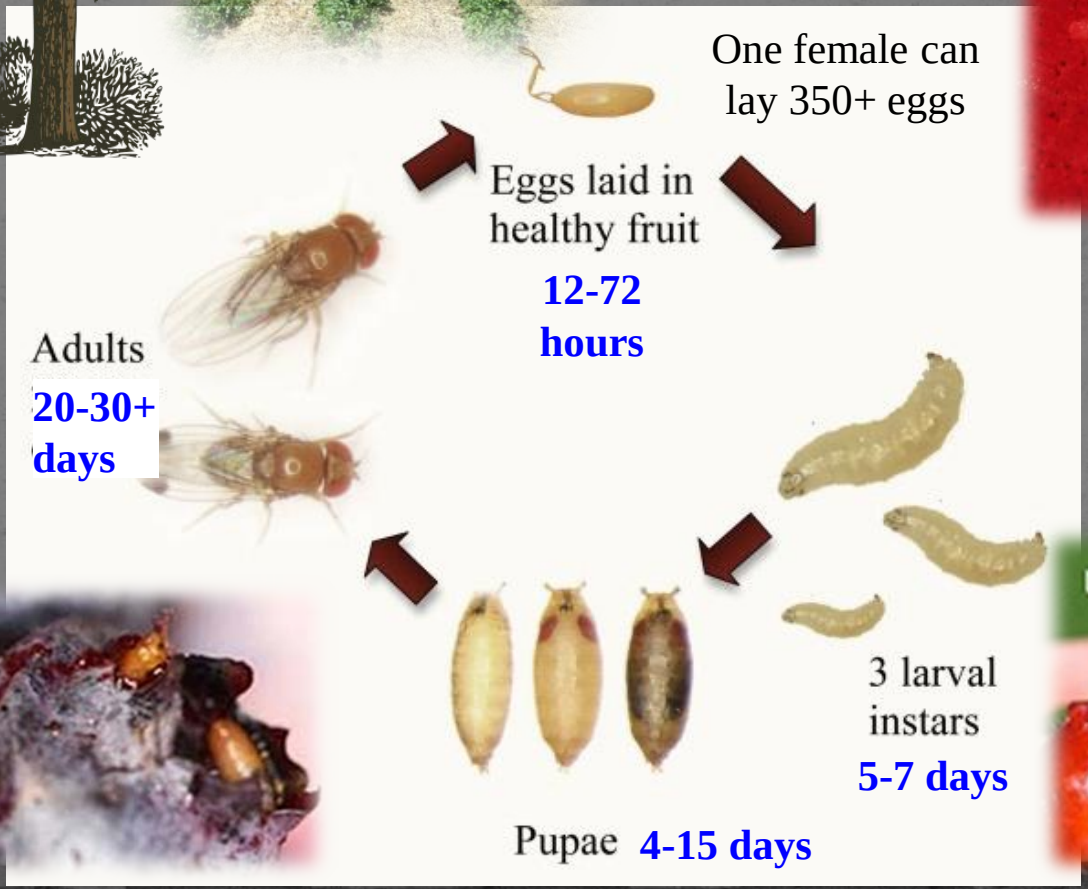

Martin Hauser

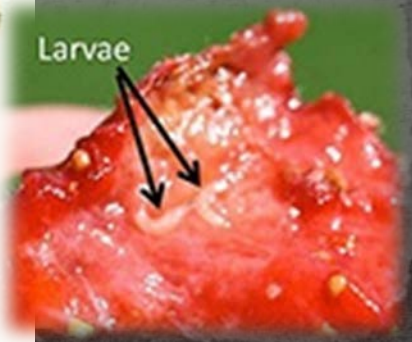

V. Walton, OSU

SWD Life Cycle

Adults overwinter – wooded field edge

One female can lay 350+ eggs



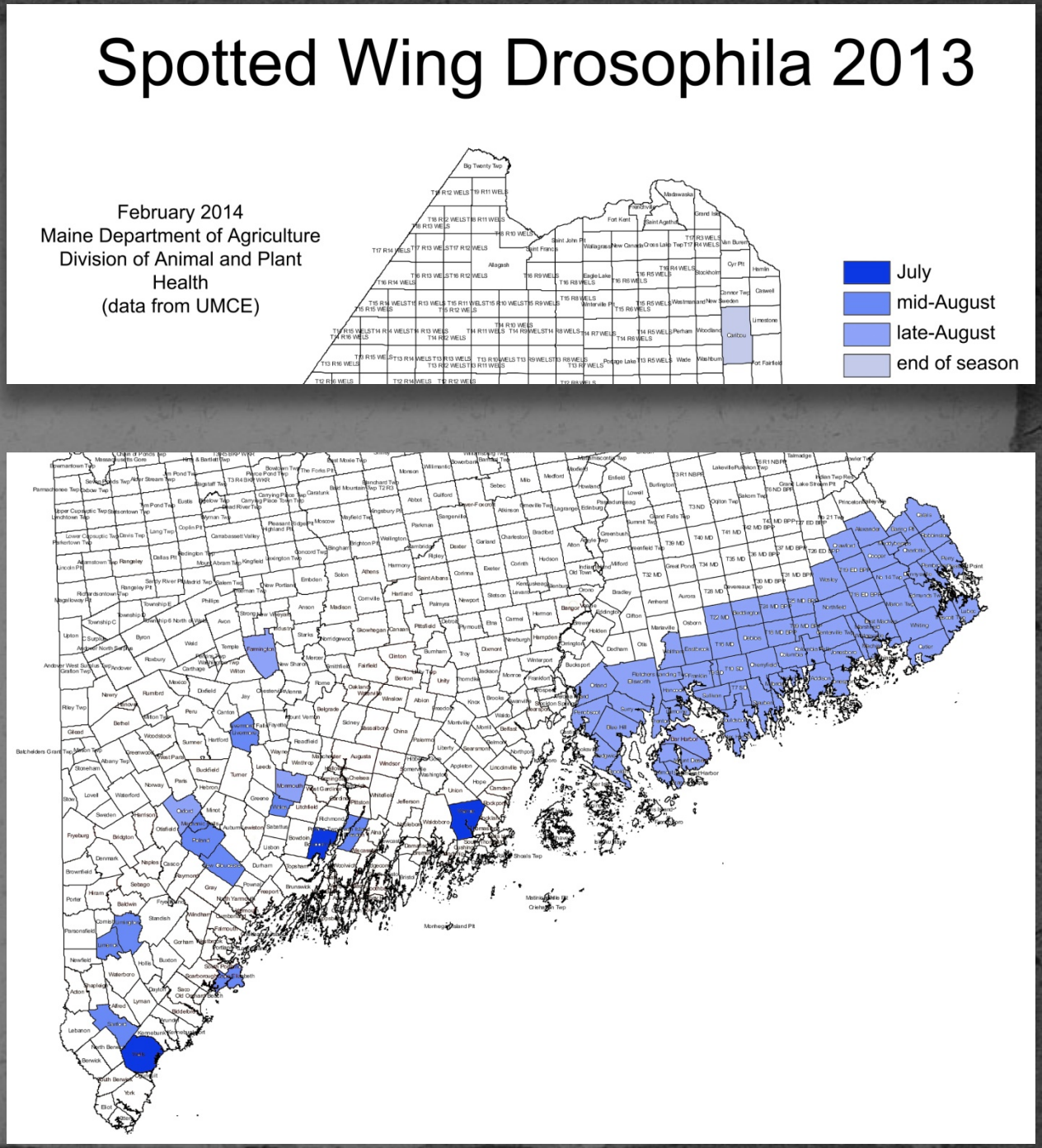


Maine, 2011

- Fall raspberries

2013

- Trapped berry fields - southern, central, coastal Maine
- First SWD, July 19 (Warren)
- Catch counts fairly low until September
- Highest numbers in southern and coastal sites
- SWD caught until late November
- Caribou – 3 SWD caught



Six Rules for Managing Spotted Wing Drosophila:

- Monitor for the flies with traps, and for the larvae in fruit.
- Spray regularly and often once flies have been found in the field (1-2/week).
- Harvest fruit regularly and often; do not leave any ripe/rotten fruit in the field.
- Sort fruit at harvest; do not leave any soft fruit in the container to be sold.
- Chill all fruit immediately after harvest to 38ºF (or as close as you can) for at least 12 hours to slow development of any eggs or larvae.
- Prune the planting to open up the canopy and create dry, light conditions.

University of Maine Cooperative Extension

http://umaine.edu/highmoor/news-events/

Brown Marmorated Stink Bug (BMSB)

Halyomorpha halys

Photos: Rutgers Cooperative Extension njaes.rutgers.edu

Eggs laid on undersides of leaves

5 nymphal stages

A "true bug" – piercing/sucking mouthparts

- 1 generation/year in northeast
- adults overwinter (in buildings) and live 6-8 months

What does it do?

- Attacks a wide variety of fruits, vegetables, ornamentals and legumes
  - – over 100 host plants documented
  - – stone fruits, apples, tomatoes, peppers, corn, soybeans, roses, crabapple…
  - – adults and nymphs – pierce the fruit; suck out nutrients


Stephen Ausmus


Chris Bergh, Virginia Tech


UMD Extension

- BMSB is a home invader
  - overwinters in buildings/homes
  - emits stinky odor

Steve Ruark,The New York Times

Recognizing BMSB

Mike Quinn, TexasEnto.net

Melinda Fawver

Brown stink bug (*Euschistus servus*)

Bark stink bug (*Brochymena quadripustulata*)

Brown marmorated stink bug (*Halyomorpha halys*)

BMSB has:

- black and white pattern around abdomen
- white bands on dark antennae
- smooth pronotum

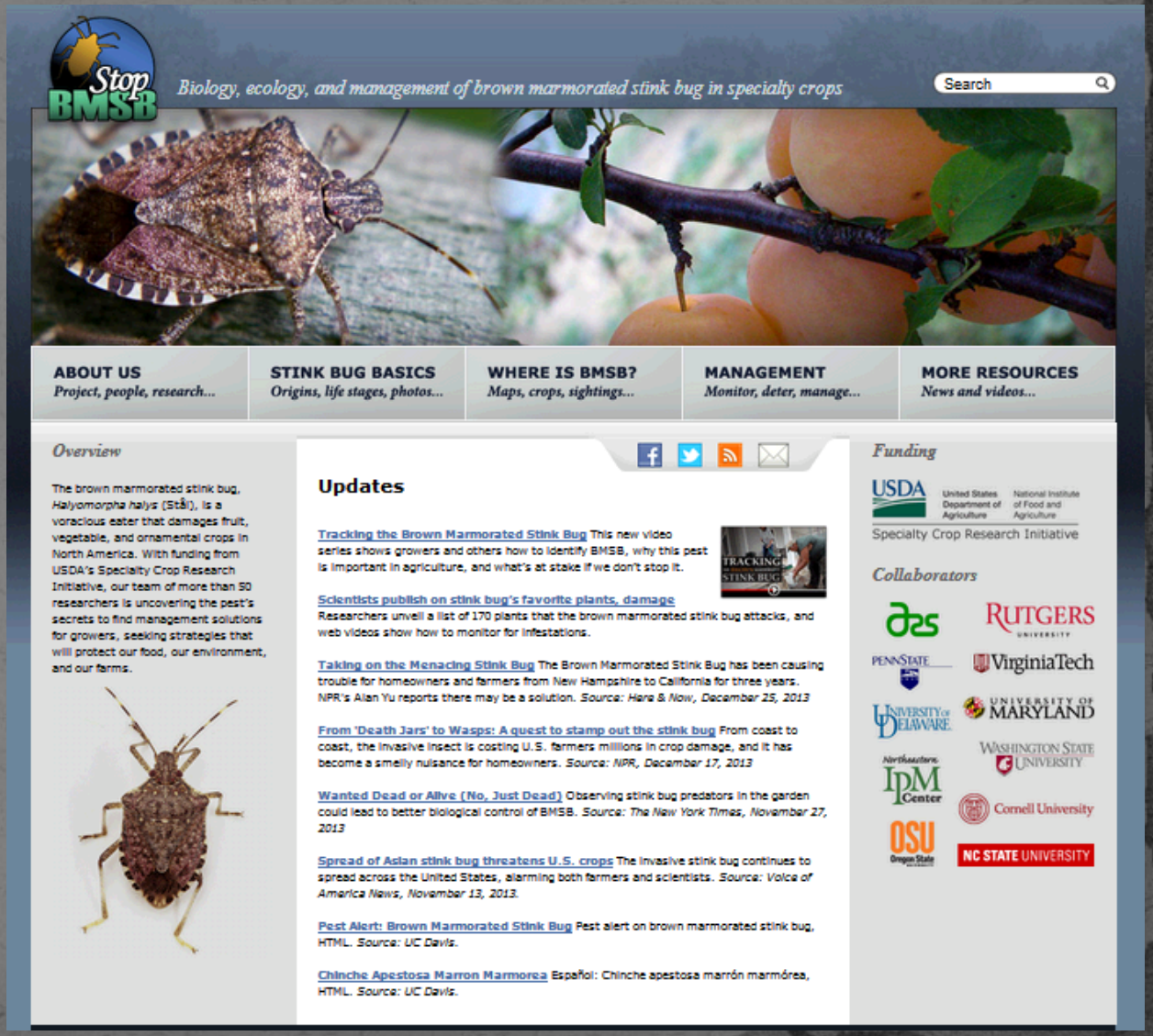
What Can You Do

Learn about BMSB

www.stopbmsb.org

Report suspicious sightings

BMSB is a home invader pest first



Hemlock Woolly Adelgid (HWA)

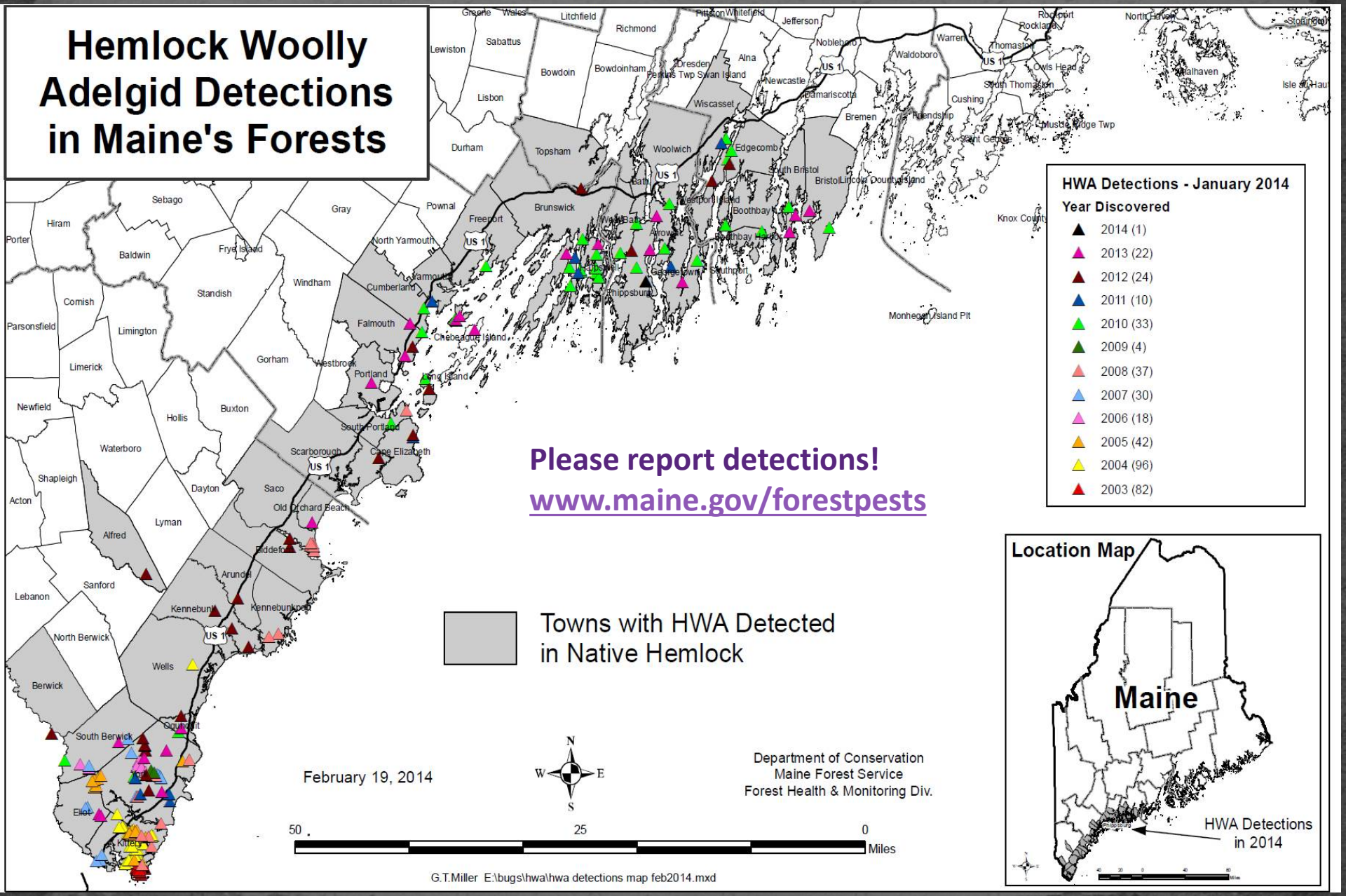
Adelges tsugae

- Host = hemlocks
  (different adelgids on other conifers)
- Causes decline/mortality of hemlocks
- Attached to twig at base of needle
- Key to detection: white waxy masses attached to twigs

Wool most visible December through June

Can be hard to see from July through October
– crawlers are invisible

Hemlock Woolly Adelgid Detections in Maine's Forests

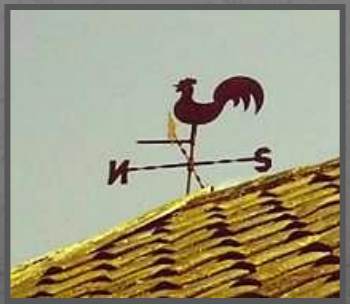


How do **WE** move them?

- *Year Round* - live plants
- *March-July* (crawlers/eggs)
  - Severed hemlock
  - Clothing, Machinery, etc.

What about natural spread?

- *March-July* (crawlers/eggs)
  - Wind and weather
  - Animals



HWA Management

Physical/Cultural :

- Prune at-risk material/infested material (August-Mar)
- Isolate from yard care / other delivery / maintenance (consider mulch)
- Replacement

Biocontrol: Forest

Regulatory: Quarantine (rooted plants, top material)

Chemical:

- Oil/Soap -- foliar
- Neonicitinoid systemic –soil / basal bark / trunk
- Combination

Winter Moth(WM)

Operophtera brumata

Waltham Services

Tom Murray, BugGuide.net

Adults: Nov - Jan

Eggs: Dec - Apr

Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org

Cape Cod Times/Steve Heaslip

Larvae: Apr - Jun

Maine Forest Service

Hannes Lemme, Bugwood.org

Pupae: Jun - Nov

What does WM do?

Larvae feed in early spring

- On newly forming buds
- Then free-feed on expanded foliage
- Causes “swiss cheese” effect


P. Johnson

Defoliate hardwood trees and shrubs

- 89,000 acres in 2011 (MA)
- Extensive oak mortality
- Problems seen in highbush blueberries, cranberries, apple orchards…

Favored hosts:

- oak
- apple
- maple
- birch
- basswood
- blueberry
- cherry


Back Bay Garden Club


Maine Forest Service

Risk of Spread

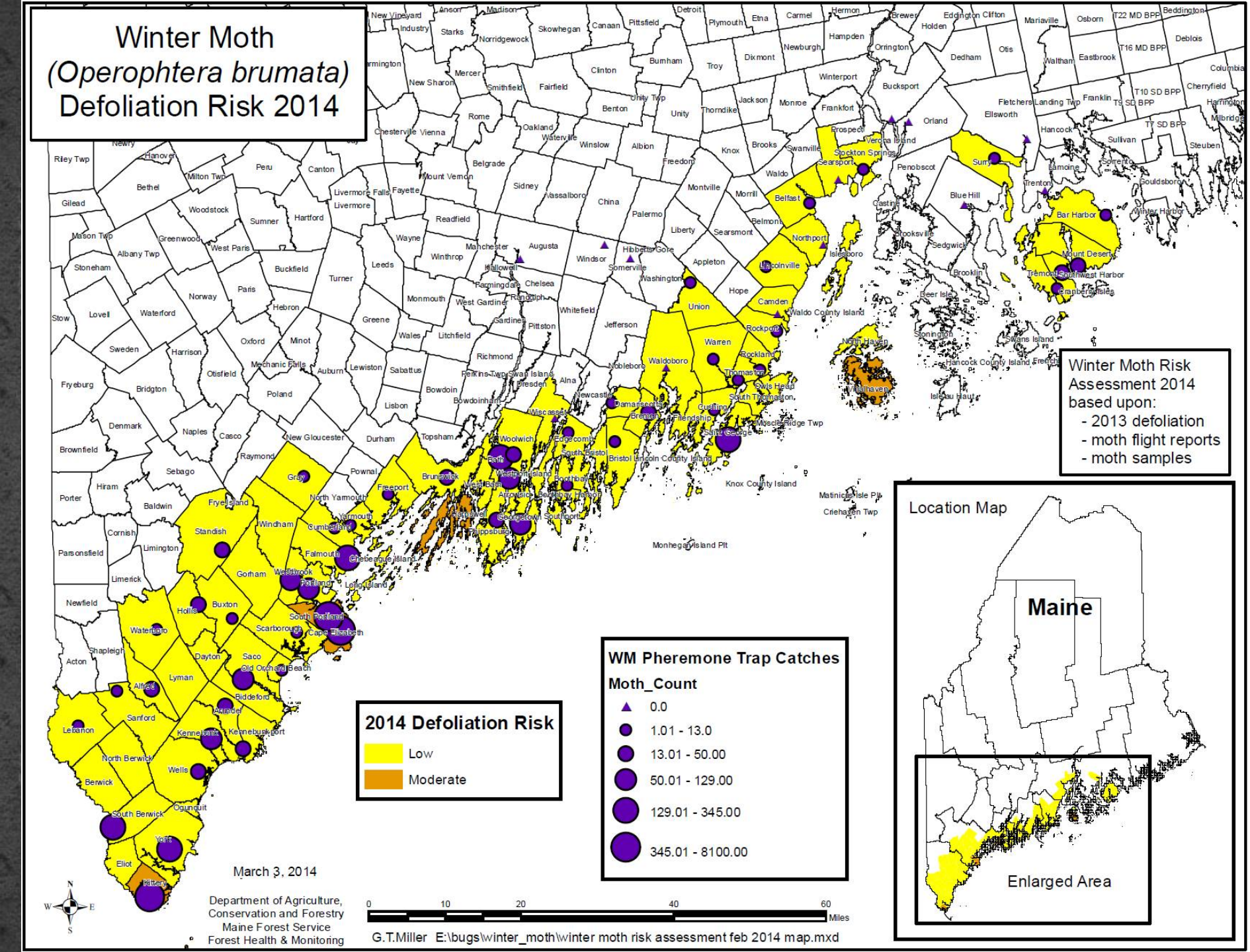
WM is in the soil from June - November!

- Coccoons look like dirt

WM is on host plants from November - June

Host plants and soil from infested areas are potential carriers

Winter Moth
(Operophtera brumata)
Defoliation Risk 2014



WM Management Options

- Monitor
  - Adults - November to January – tree banding or pheromone traps
  - Larvae – April - visual
- Dormant oil sprays – overwintering eggs
- *Bacillus thuringensis* kurstaki
  - Works best on young larvae, but not effective if larvae are feeding inside buds
- Other sprays – spinosad, tebufenozide, insecticidal soap, carbaryl, malathion, pyrethroids

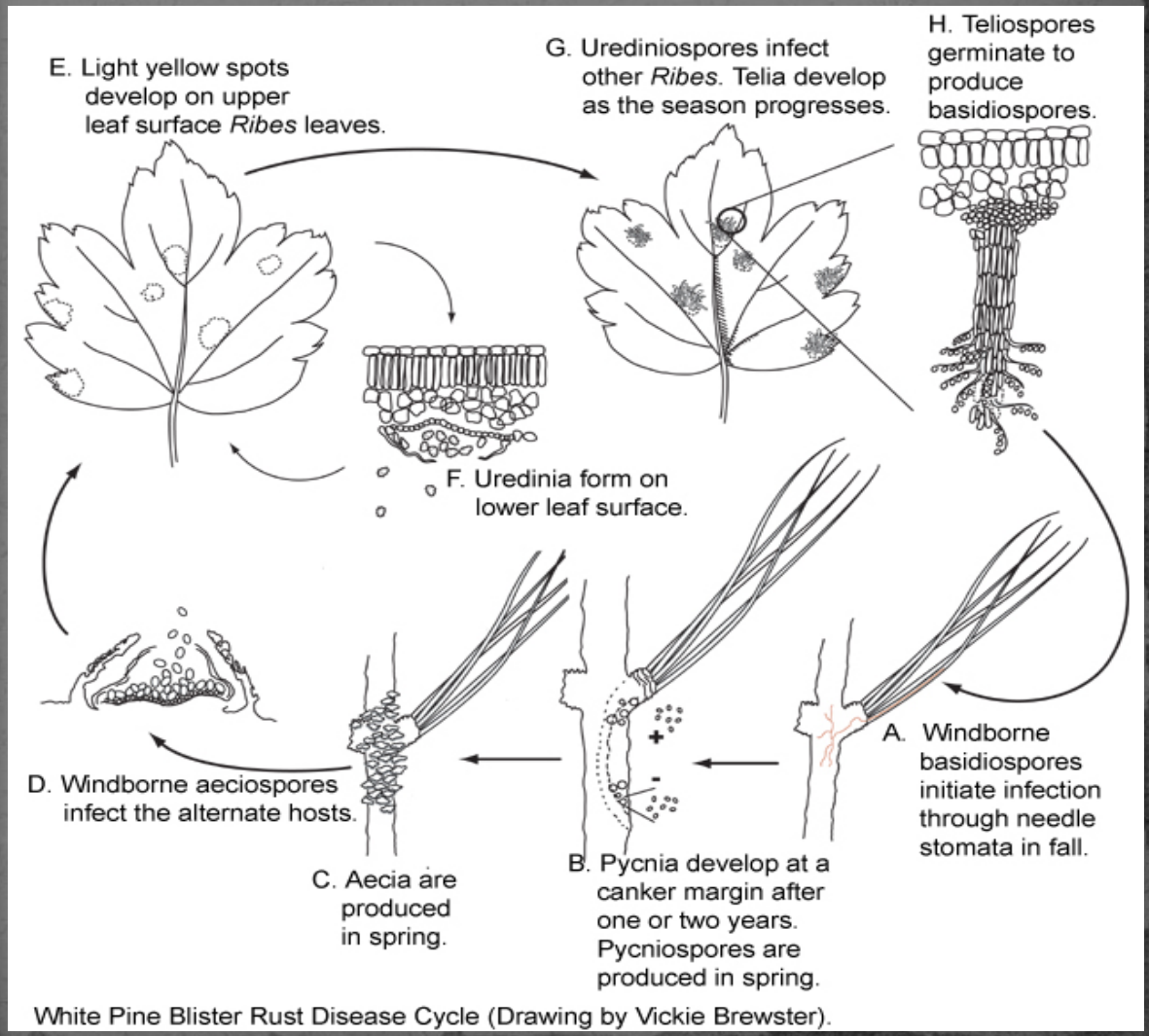
- Biological control
  - Parasitic fly – *Cyzenis albicans*
  - Successful control in Nova Scotia
  - Also in British Columbia and now in Massachusetts

Eggs are laid on surface of host leaves

White Pine Blister Rust (WPBR)

Cronartium ribicola

Disease of 5-needle pine and *Ribes spp*.

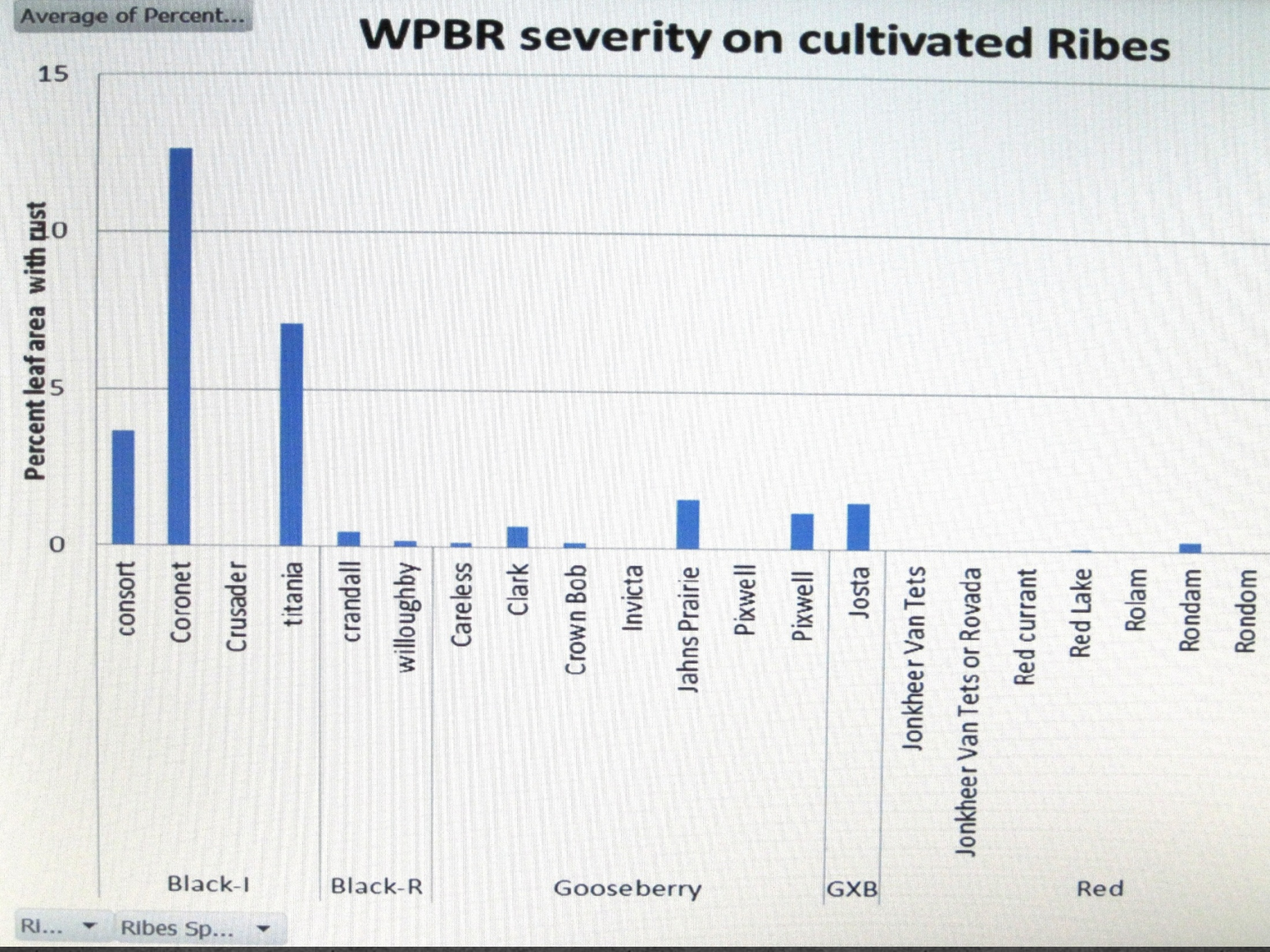


White Pine Blister Rust Disease Cycle (Drawing by Vickie Brewster).

On Ribes: Severity Ratings (%):

1, 5, 12

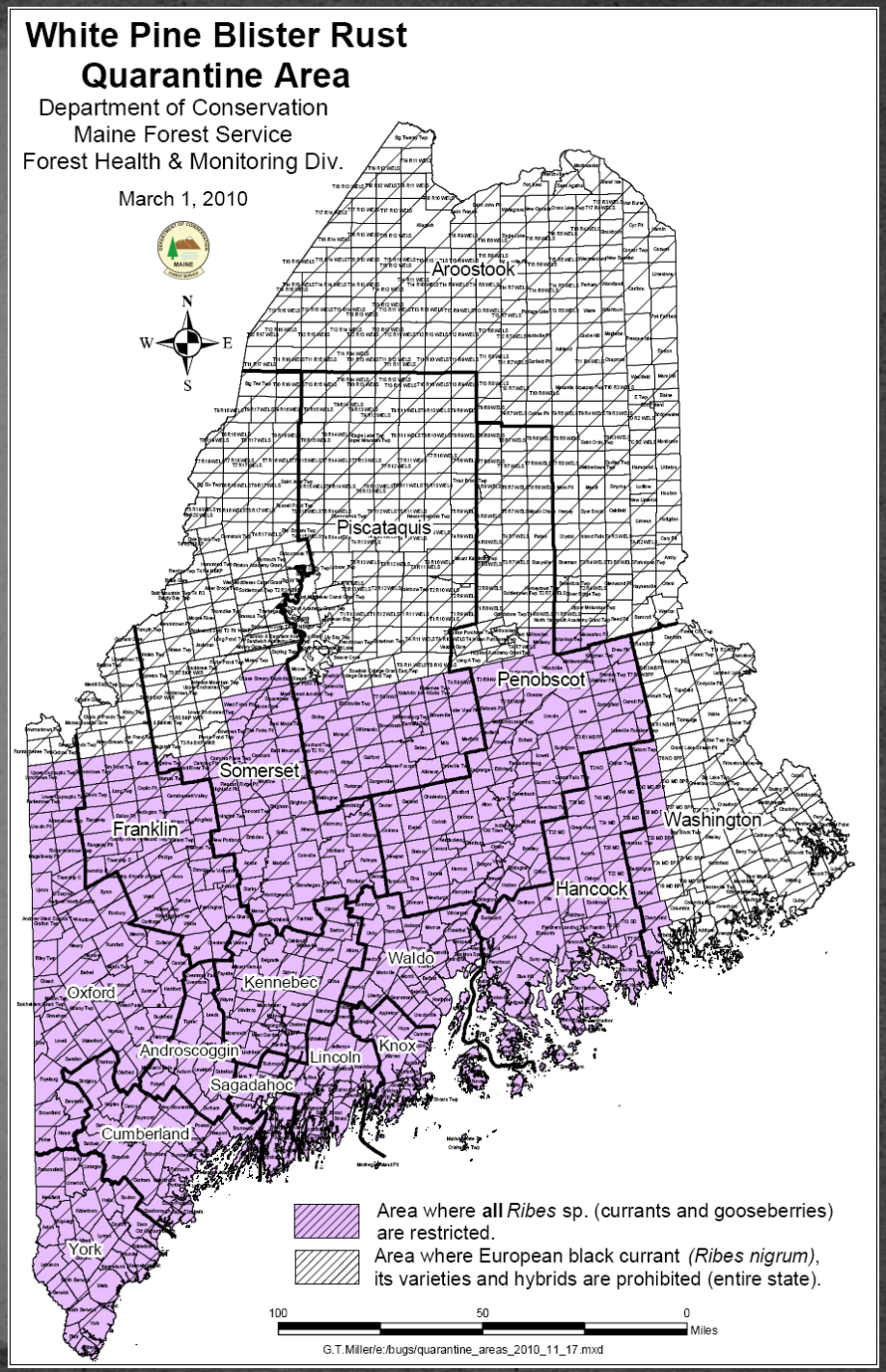
25, 50, 75


Average of Percent...
WPBR severity on cultivated Ribes
Percent leaf area with rust
15
10
5
0
consort
Coronet
Crusader
titania
crandall
willoughby
Careless
Clark
Crown Bob
Invicta
Jahns Prairie
Pixwell
Pixwell
Josta
Jonkheer Van Tets
Jonkheer Van Tets or Rovada
Red currant
Red Lake
Rolam
Rondam
Rondom
Black-I
Black-R
Gooseberry
GXB
Red
RI...
Ribes Sp...

Quarantine
Currants and Gooseberries

- Planting of plants in genus *Ribes* (currants and gooseberries) prohibited on town-by-town basis
- The planting or possession of European black currant, *Ribes nigrum* or its varieties anywhere within the boundaries of the State of Maine is prohibited.

http://www.maine.gov/dacf/mfs/forest_health/diseases/white_pine_blister_rust_rule.htm



Impatiens Downy Mildew (IDM)

Plasmopara obduscens

- Caused by fungus *Plasmopara obduscens*
  - not the same pathogen that causes downy mildew on other crops
- Only infects *Impatiens walleriana* & *Impatiens balsamina*
  - May also infect jewelweeds
- Spread by:
  - Infected plant material
  - Spores that blow long distances in the wind or that splash from plant to plant
  - Produces resting spores that may overwinter in the soil

IDM Symptoms

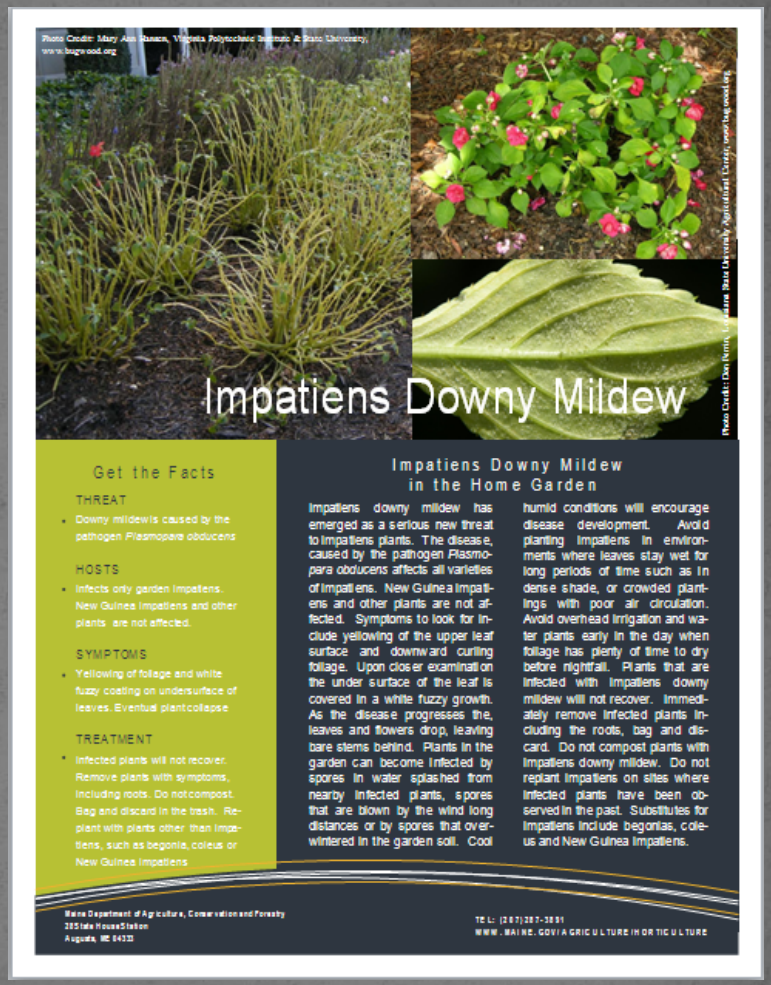
Yellowing, downward curling foliage

White fluffy growth on underside of leaf

Defoliation

IDM Recent History

- Grower response to threat
  - Most grew fewer impatiens,
  - Customer education
- Most common replacements
  - New Guinea impatiens, begonia, torenia, coleus
- Reports of IDM in Maine 2013
  - 4 in August & September (Bath, Bangor, Portland, Orono)
  - No symptoms observed at greenhouses
- Why fewer reports of IDM?
  - Fewer impatiens grown
  - More preventative measures
  - Possibly unfavorable weather conditions



IDM Future

- Impatiens downy mildew is still here
- Continue to use caution when deciding what to grow for impatiens next season
- If you do grow impatiens continue to:
  - use preventative measures,
  - scout your crop,
  - take action if symptoms are observed

www.maine.gov/dacf/php/horticulture/growerresources.shtml

Invasive Plants

- ~ 2,100 plant species recorded from Maine
- ~ 1/3 of those are not native
- A small fraction of those are considered invasive
- These have the potential to cause great harm to our landscape

- Increase the costs of agriculture
- Affect forest regeneration
- Threaten our recreational experiences
- Decrease property values
- Outcompetes native species
- Change animal habitat by eliminating native foods, altering cover, and destroying nesting opportunities.

Aquatic invasives can choke waterways, making it difficult to boat or swim.

Herbaceous Plant Control

- Act before seed set and senescence
- Dead head
- Dispose of properly – don't compost!
- Remove entire plants with all roots

Woody Plant Control

- Mechanical
  - Repeated cutting
  - Remove all roots
  - Careful disposal
  - Repair disturbed area
  - Weed wrench
- Chemical
  - Read label carefully
  - Glyphosate (Roundup) or Trichlopyr (Garlon)
  - Prevents resprouting
  - Often most cost effective

Oriental Bittersweet

Celastrus orbiculatus

Oriental Bittersweet

- Identification
  - Bright orange/red fruit borne along the stems
  - Alternate leaves (yellow in fall)
  - Roots are bright orange
- Spread
  - Large # of seeds
  - Bird dispersed
  - Suckers and fragments
- Management
  - Cut stump treatment

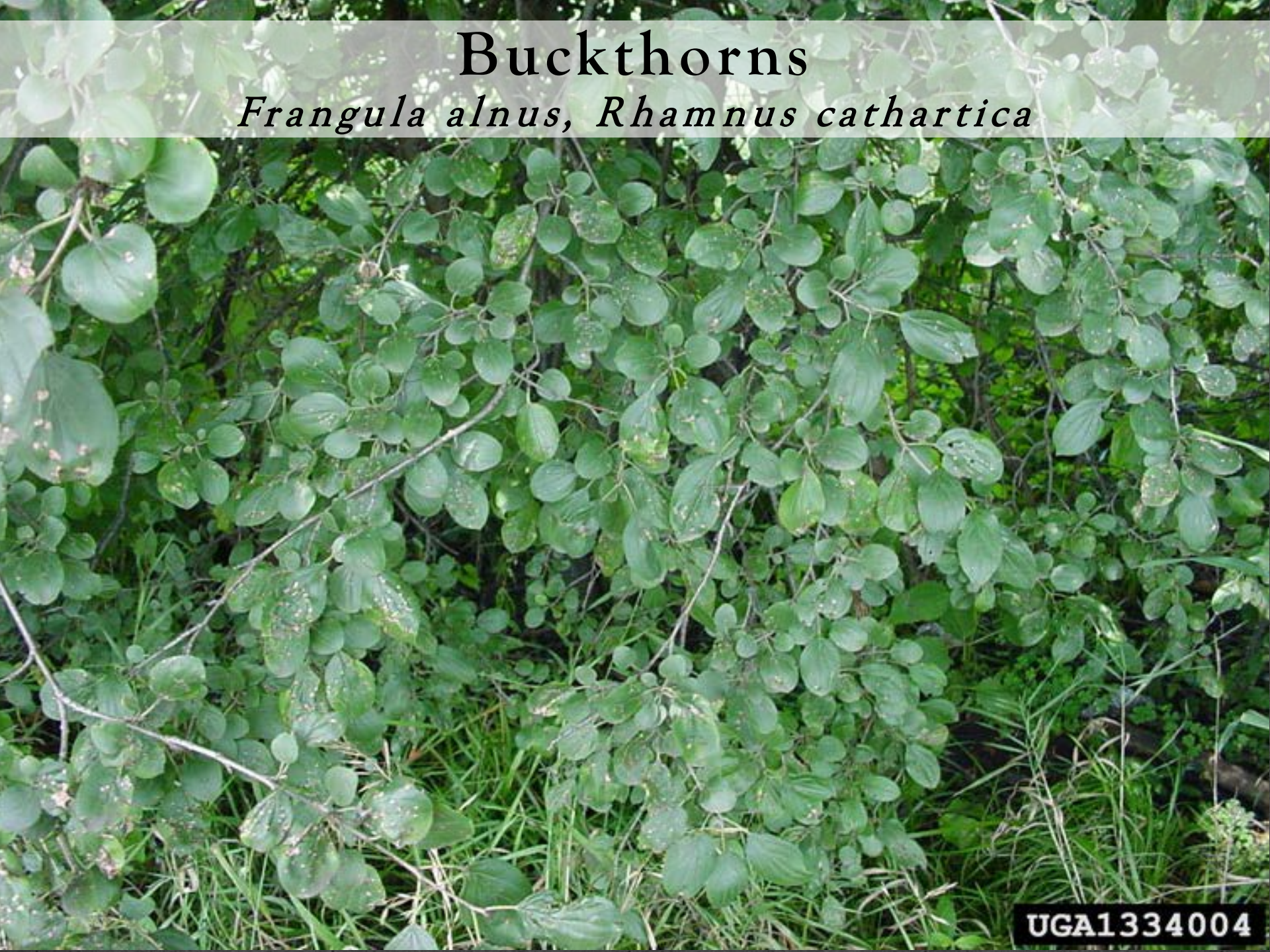
NATIVE Look-A-Like

American bittersweet *(Celastrus scandens)*

Terminal Inflorescence (fewer seeds)

Buckthorns

Frangula alnus, Rhamnus cathartica

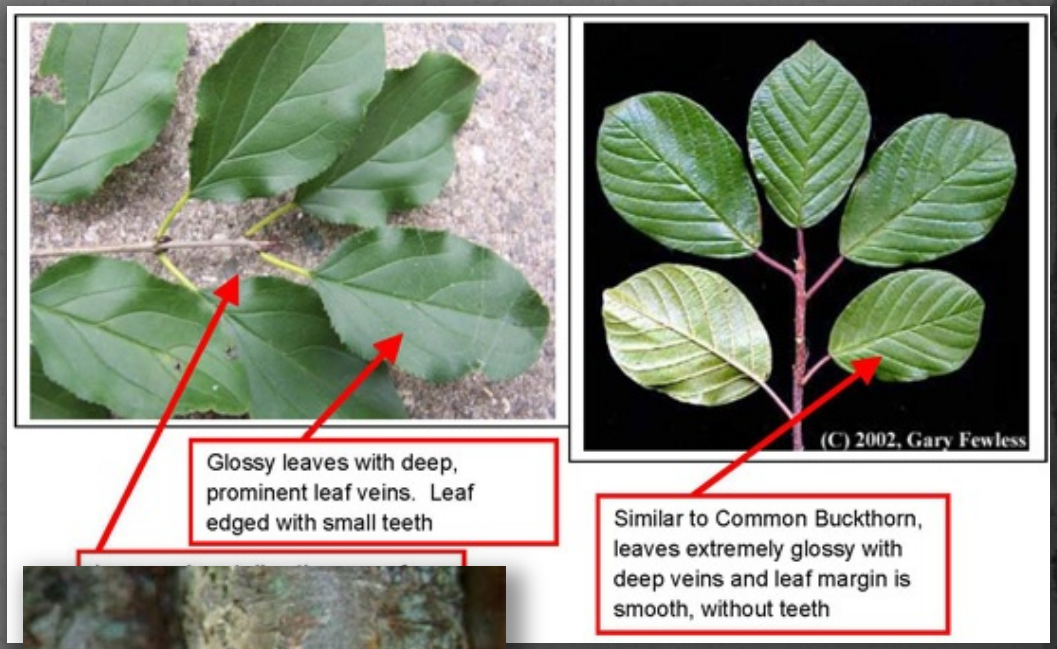


Glossy Buckthorn *(Frangula alnus)*

- Identification
  - Alternate leaves
  - No spines on stems
  - Flowers and fruit occur at the same time
- Spread
  - Prolific fruit- seeds dispersed by birds/animals
  - Fruit floats for 9-16 days
  - Rapid growth
- Management
  - Weed wrench
  - Cut stump treatment

Common Buckthorn *(Rhamnus cathartica)*

- Differences from Glossy Buckthorn
  - Leaves nearly opposite; edged with small teeth
  - Semi-sharp spine on twigs
  - Inner bark is orange
  - Fruit ripens later
  - Seeds viable for 2 years
  - More shade tolerant



Japanese Knotweed

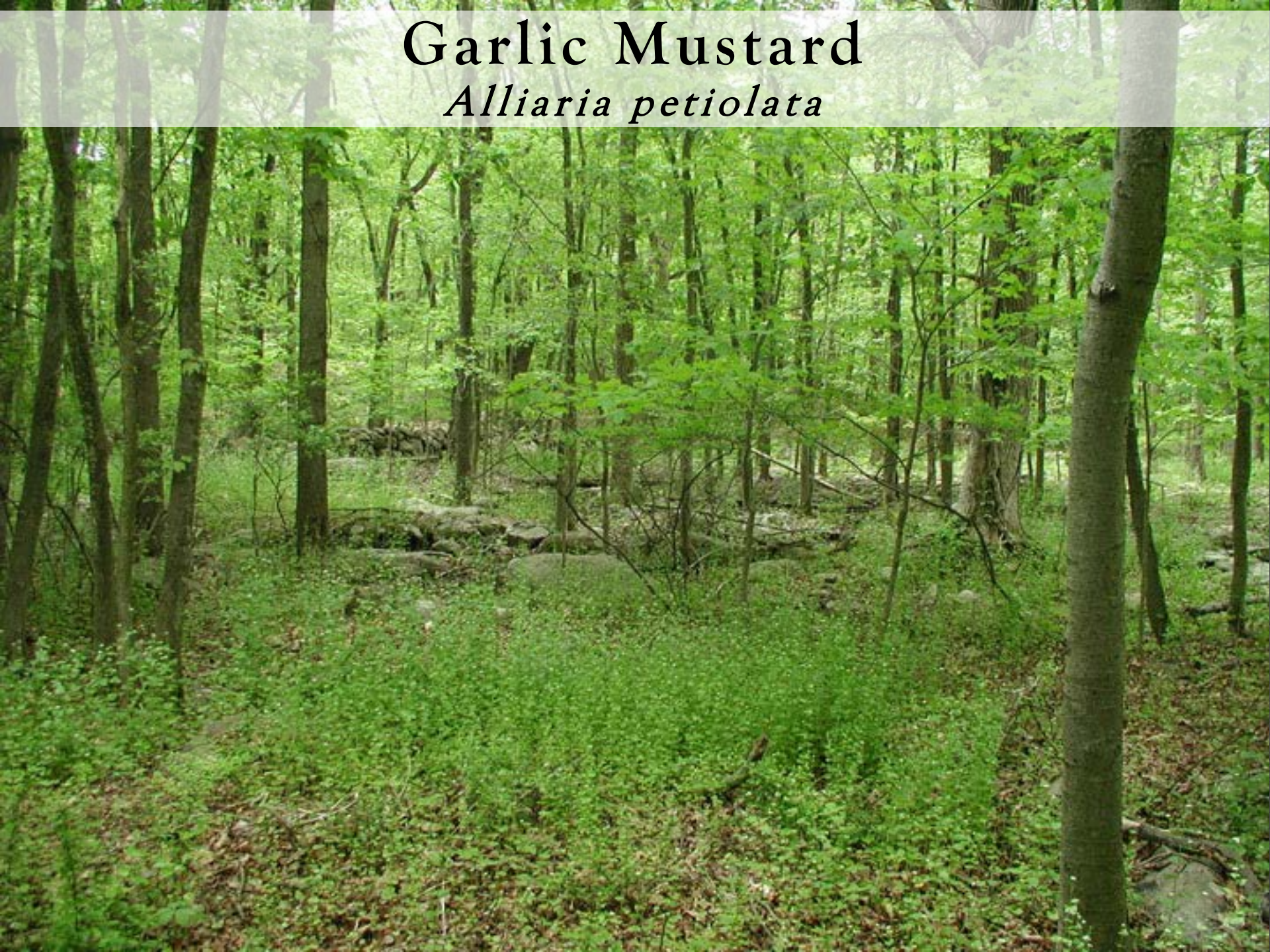
Fallopia japonica

Japanese Knotweed

- Identification
  - 3 to 10 feet tall
  - Round hollow stem
  - Fruit - papery and winged
- Spread
  - Reproduces via rhizomes
- Management
  - Solid mulch
  - Mowing
  - Goats
  - Need to continuously control

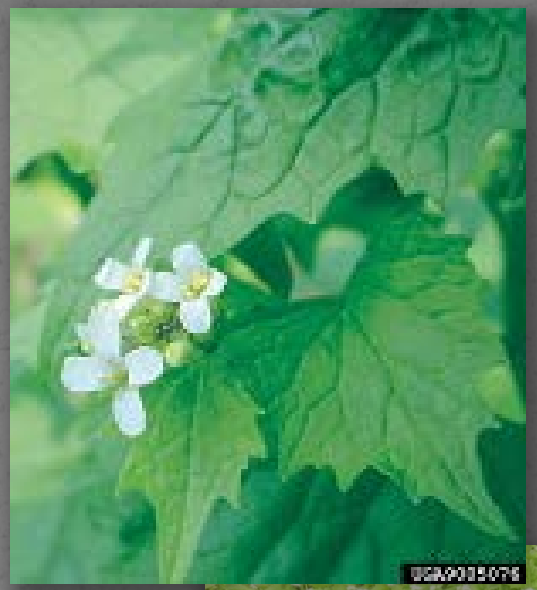
Garlic Mustard

Alliaria petiolata



Garlic Mustard

- Identification
  - Strong garlic odor
  - Heart shaped leaves
  - 4 parted white flower (crucifer)
  - Plants dieback in June
- Spread
  - Exclusively by seed
- Management
  - Hand pulling
  - Herbicide
  - Possible biocontrol



Multiflora Rose

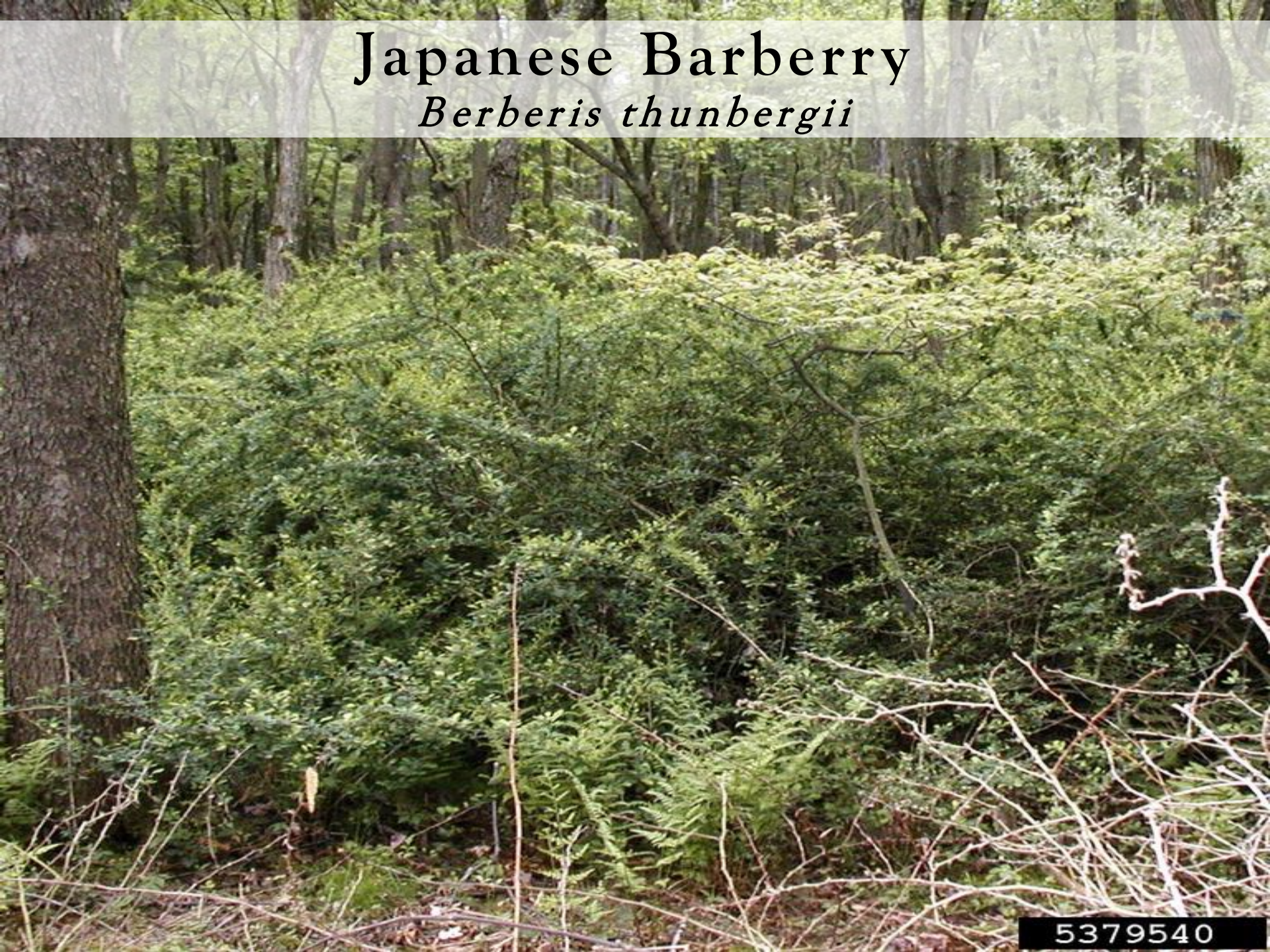
Rosa multiflora

Multiflora Rose

- Identification
  - Alternate leaves with stipules
  - Thorns!!!
  - Clusters of fragrant white flowers
  - ¼” egg shaped rosehips
- Spread
  - Prolific seed dispersed by birds
  - Root Sprout
  - Layering
- Management
  - Rose rosette disease
  - Spot treatment with herbicide

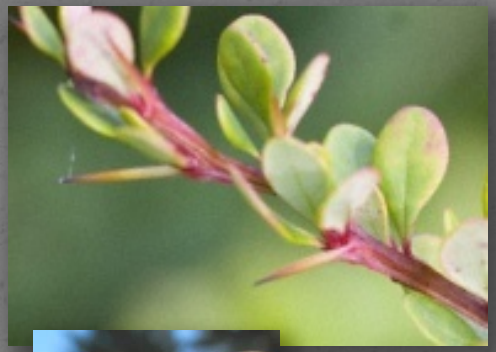
Japanese Barberry

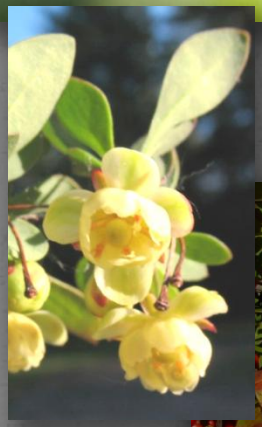
Berberis thunbergii



Japanese Barberry

- Identification
  - Small spatulate leaves
  - Sharp spines at leaf base
  - Yellow spring flowers
  - Red fruits
- Spread
  - Prolific Seeds
    - High germination rate
    - Eaten by wildlife
  - Root Sprout
  - Layering
- Management
  - Hand pulling isolated plants
  - Foliar spray, cut stump, basal bark treatments





Next Steps and Opportunities

Act to prevent the spread of invaders while most of our natural systems are still in good condition.

- Prevention
- Early Detection / Rapid Response
- Control, Management, Restoration




Protecting native species

Prevention

- Public Outreach/Education
- Awareness
- Best practices (e.g. don't move plant material – including firewood)

Early Detection / Rapid Response

- Keep alert; survey
- Collect suspect specimens or take photos
- Note location and REPORT

Control, Management & Restoration

- Know the species and life cycle
- Ask professionals for best management strategies
- Don't give up

Positive Spin

- Value in these species?
  - Food
  - Art

Resources

Invasive Forest Pests: www.maine.gov/forestpests

Invasive Agricultural Pests: www.gotpests.org

Invasive Plants:

- www.maine.gov/dacf/mnap/features/invasive_plants/invasives.htm
- www.gobotany.newenglandwild.org/
- www.vtinvasives.org/
- www.nps.gov/plants/alien/factmain.htm