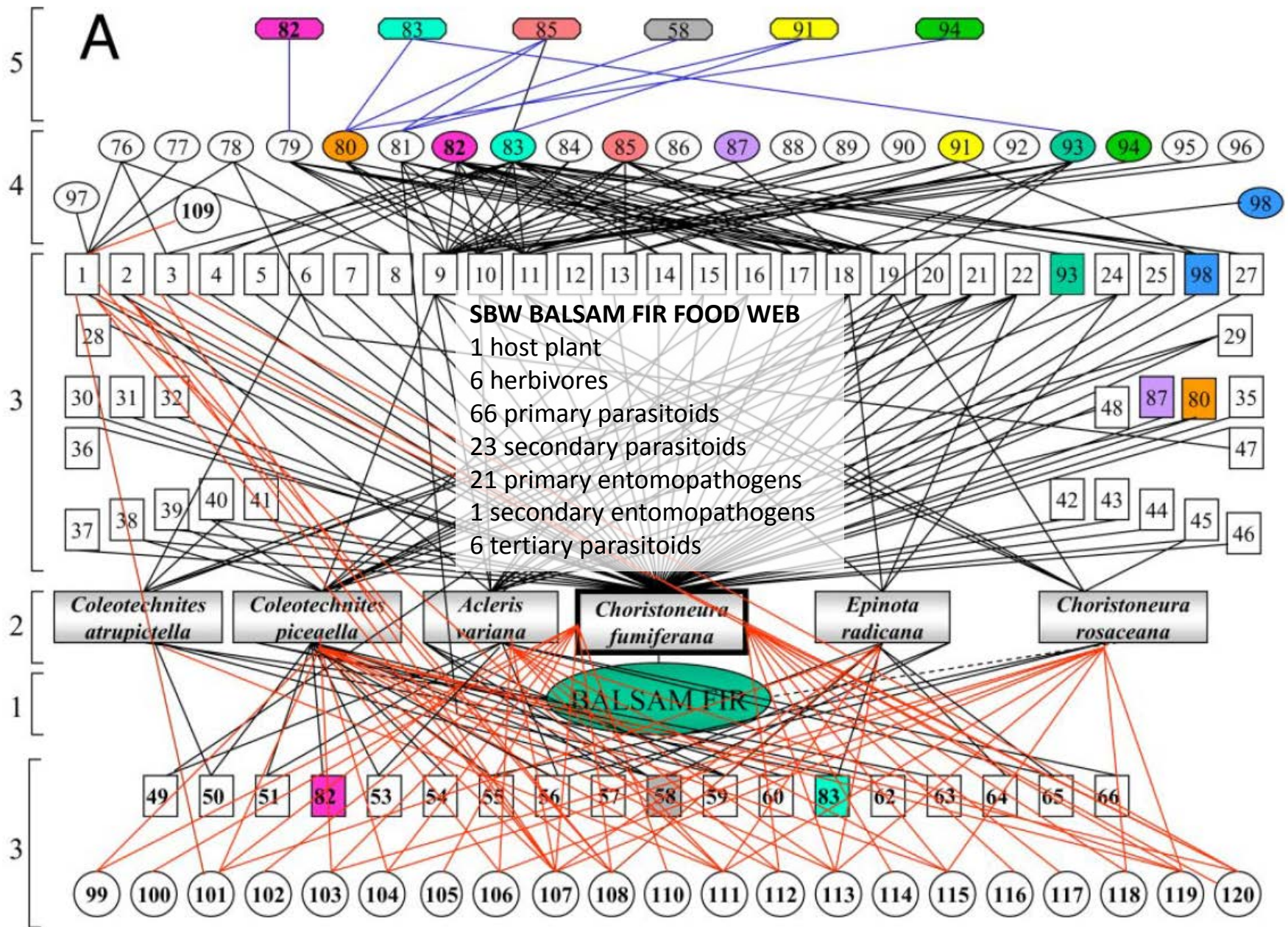


# Biological Control in Maine's Forests

Colleen Teerling  
Forest Entomologist  
Maine Forest Service

# A partial food web to illustrate the significance of "Native"



# Ginkgo biloba





# Gypsy Moth

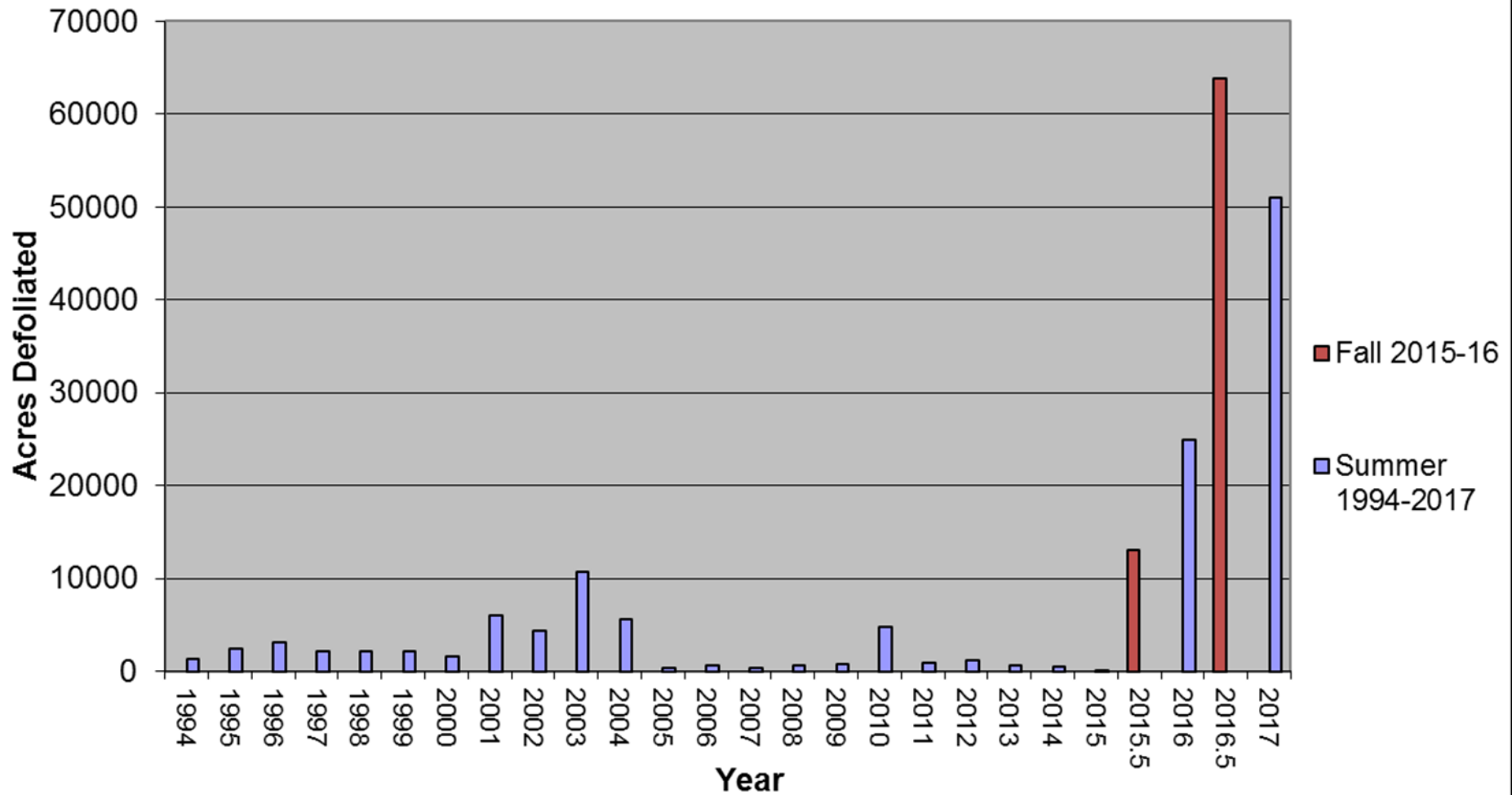




# Browntail Moth



## Browntail Moth Defoliation in Maine



Maine Forest Service Aerial Survey

# Compsilura concinnata





# Winter moth





# Cyzenis albicans

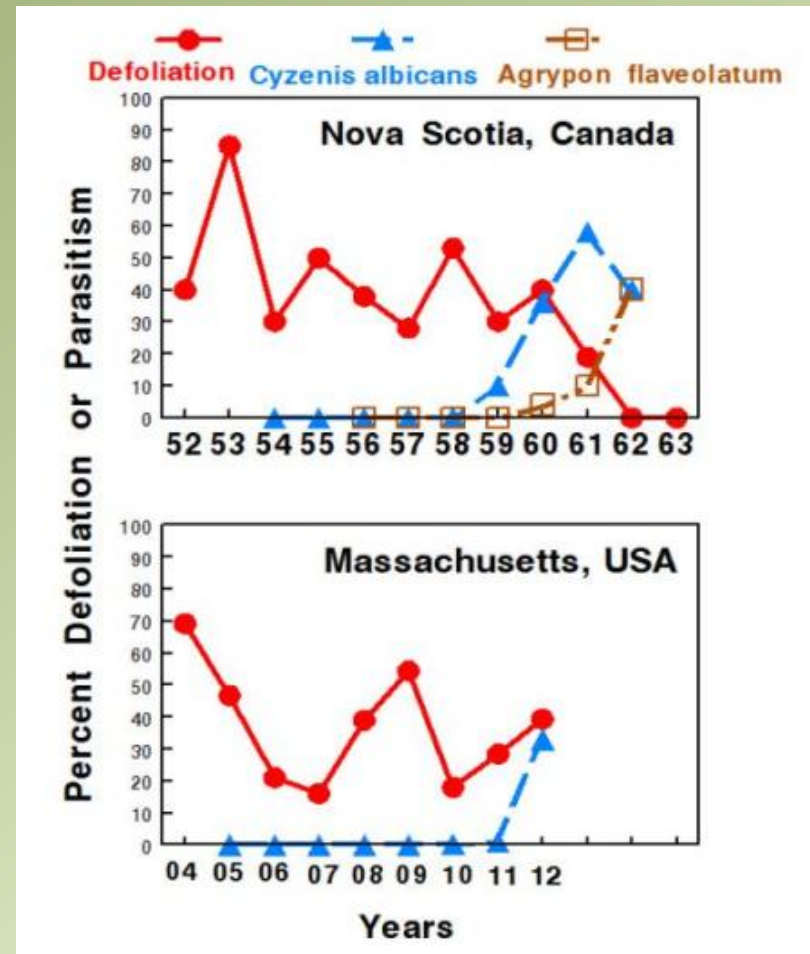
One of the few  
success stories  
in biological  
control for  
forest insects





# Winter Moth Parasitism

- Took 6 years to start finding flies in Nova Scotia, MA
- Now starting to get numbers that may control winter moth



- Biocontrol

- Federally funded program with UMass
- *Cyzenis albicans* release in Maine
- Flies recovered in 2016 from Cape Elizabeth and Kittery indicating flies are becoming established in Maine

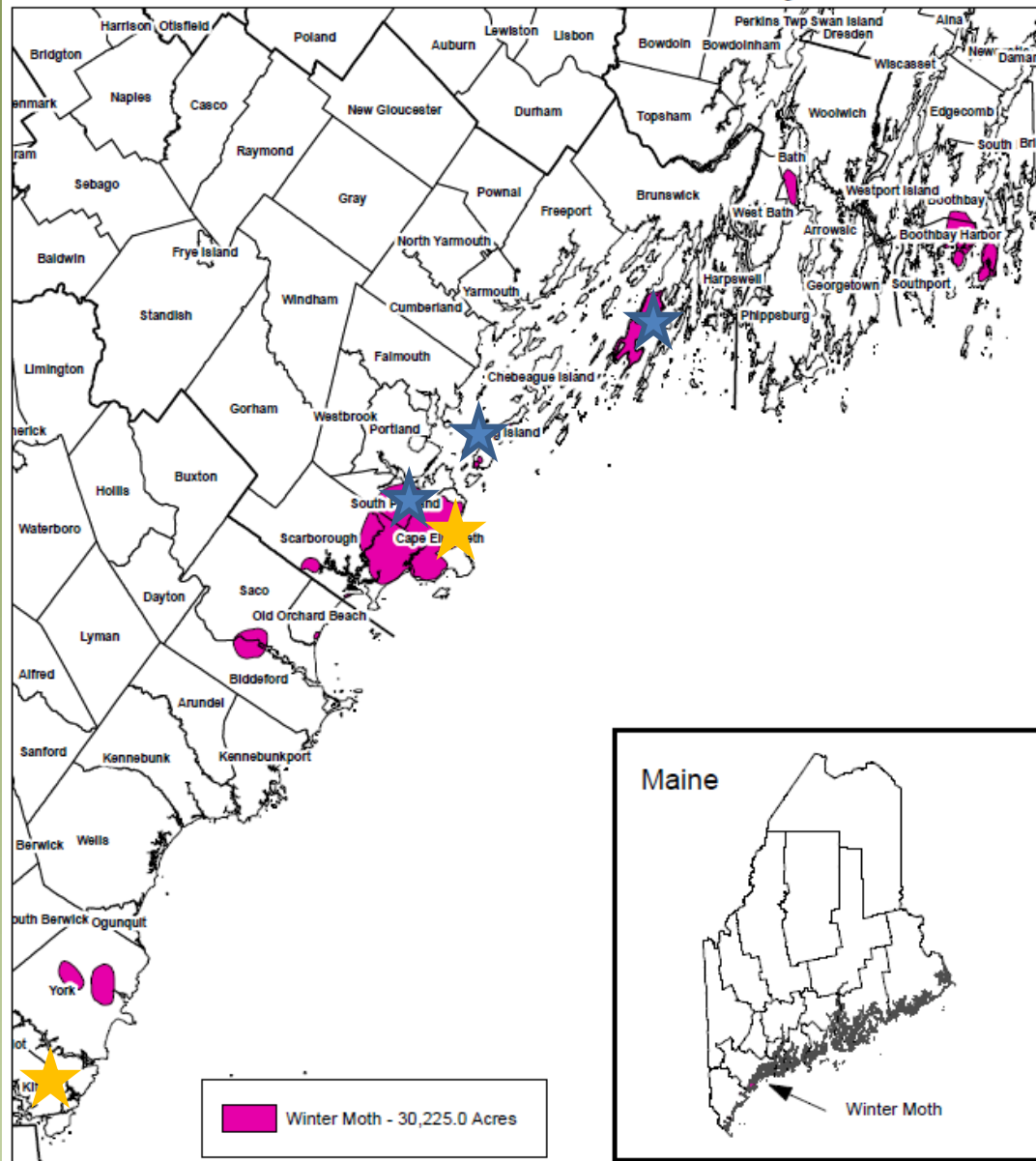


Town	County	Dates	Number of <i>Cyzenis albicans</i>
Harpswell	Cumberland	May 1, 2013	2000
Cape Elizabeth	Cumberland	May 1, 2013	2000
Kittery	York	May 16 & 23, 2014	1200
Harpswell	Cumberland	May 16 & 22, 2014	1200
Vinalhaven	Knox	May 21, 2014	2000
Portland	Cumberland	May 15, 2015	2000
Cape Elizabeth	Cumberland	May 15, 2015	1000
Harpswell	Cumberland	November 15, 2016	2000
South Portland	Cumberland	November 29, 2017	3000

Can't do it alone!



# Winter Moth Defoliation 2017 Aerial Detection Survey



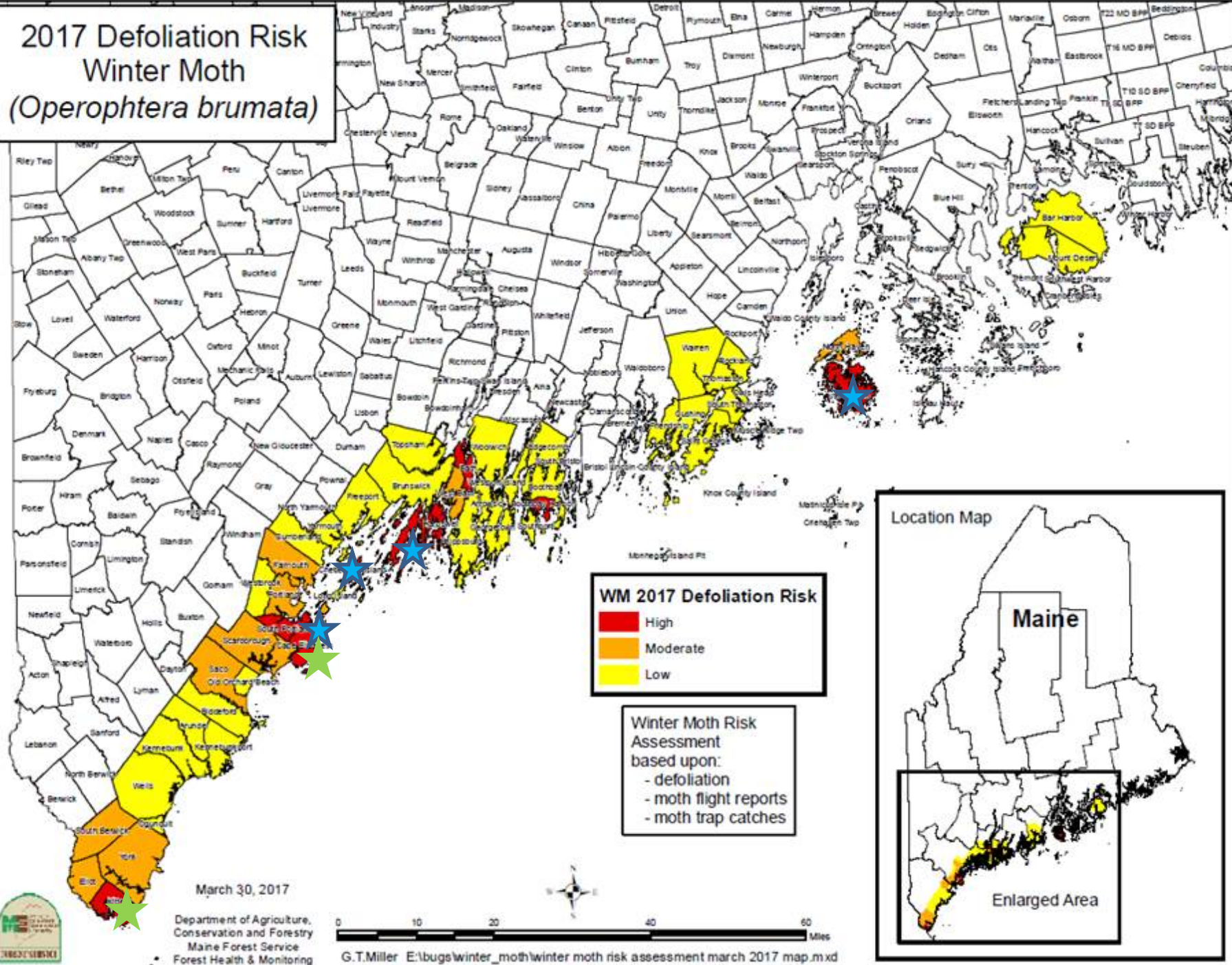
Department of Agriculture,  
Conservation and Forestry  
Maine Forest Service  
Forest Health & Monitoring



November 29, 2017

GTMiller D:\flightlines\2017\winter moth 2017.mxd

# 2017 Defoliation Risk Winter Moth (*Operophtera brumata*)



# Cratichneumon culex (Muller)

## Parasitic Wasp in ME

- Searching activity observed in winter moth sites
- Specimens ID'd – cocoon parasite from Europe
- Generalist parasite of winter moth – very wide host range
- Don't know what effect it will have on winter moth



2010 ©  
Miroslav Fiala



# Hemlock Woolly Adelgid



# HWA Biocontrol

## *Sasajiscymnus tsugae* (St)

St, a lady beetle (Coccinellidae), is an important predator of HWA in Japan. Releases of St in Maine against HWA began in 2004. It has since become established at several sites. Unlike some other lady beetles, this insect does not invade homes in the winter.

**Color:** Black

**Shape:** Oval

**Size:** 1/16<sup>th</sup> inch

**Origin:** Japan



Image: Dr. Carole Cheah, CAES, bugwood.org

## *Laricobius nigrinus* (Ln)

Ln is a tooth-necked fungus beetle (Derodontidae). It is an important predator of HWA in the Pacific Northwest. This species was first released in Maine in 2006. A second *Laricobius* species is a candidate for future releases.

**Color:** Black

**Shape:** Oval

**Size:** 1/10<sup>th</sup> inch

**Origin:** Pacific Northwest



### Predatory Beetles:

- One commercial vendor (~2.50 each) for St -- costly
- Long horizon
- Uncertain results
- Not compatible with insecticide-intensive residential areas

# HWA Biocontrol

## *Sasajiscymnus tsugae* (St)

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**Shape:** Oval

**Size:** 1/16<sup>th</sup> inch

**Origin:** Japan



Image: Dr. Carole Cheah, CAES, bugwood.org

## *Laricobius osakensis* (Lo)

Lo is a tooth-necked fungus beetle (Derodontidae). It is an important predator of HWA in Japan. This species was first released in Maine in 2016.

**Color:** dark brown

**Shape:** Oval

**Size:** 1/8<sup>th</sup> inch

**Origin:** Japan



L. osakensis, male

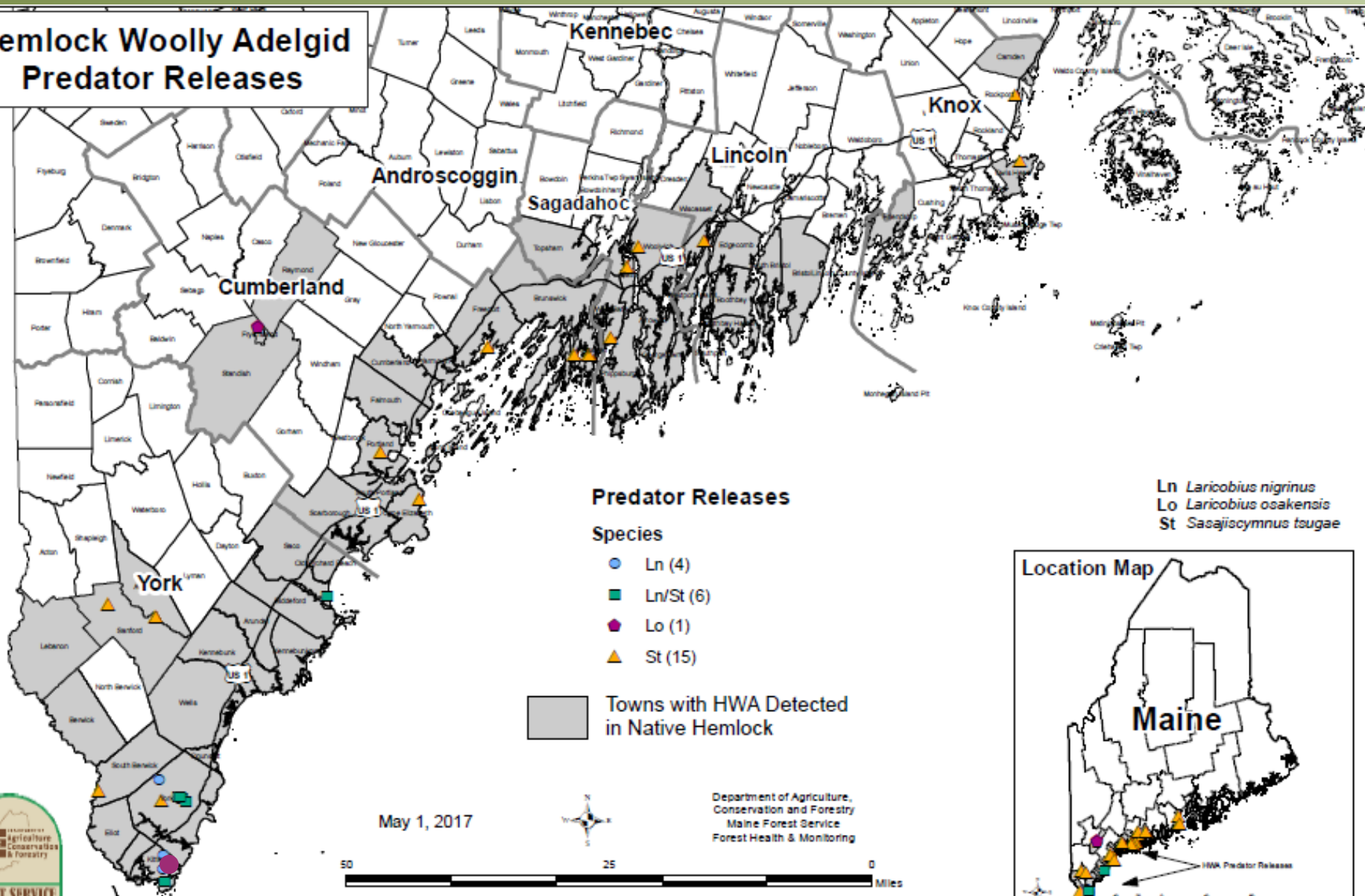
L. osakensis, female

## Predatory Beetles:

- One commercial vendor (~2.50 each) for St -- costly
- Long horizon
- Uncertain results
- Not compatible with insecticide-intensive residential areas



# Hemlock Woolly Adelgid Predator Releases



G.T.Miller E:\bug\hwa\hwa predator releases april 2017.mxd









# Elongate Hemlock Scale



# Cybocephalus nipponicus

