Winter Moth Detection and Management

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Winter moth

• Damage & History
• Biology
• Monitoring
• Control
• Biocontrol
Winter moth

• **Damage & History**
  • Biology
  • Monitoring
• Control
• Biocontrol
Winter moth adults
Called winter moths because moths out in ‘winter’

Photo Bob Childs, UMass
Other ‘Winter’ fliers

• Fall cankerworm

• Bruce spanworm – look just like winter moth
  – Emerge ~ 2 weeks earlier
  – Lots of BS moths in western MA 2015
Typical winter moth damage on Oaks
27,000 acres defoliated in RI & 22,000 acres in Massachusetts in 2015
Invasion History

Invasive insect from Europe

1930s: NS
1970s: BC, WA, and OR
1990s: MA
Has spread to ME, RI, CT, and NY

High density pest
- Almost continuous outbreaks
- Defoliation on deciduous trees
- Pest on apple and blueberry
Winter moth

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Winter Moth

*Operophtera brumata*

Hosts: maple, oak, crabapple, apple, cherry, basswood, ash, white elm, linden, viburnum, blueberry, birch, beech, spruce, rhododendron
Adults emerge Nov-Dec, mate, lay eggs and die.

Eggs overwinter, larvae hatch early spring

**Winter Moth Life Cycle**

Winter -> Spring

Spring -> Summer

Winter <- Fall

Fall <- Summer

Larvae feed early spring and pupate in late May

Pupae in soil all summer and early fall

Photos: R. Childs and J. Troubridge
• Moths emerge Thanksgiving - Christmas
• Females climb up & deposit eggs singly on bark
Egg hatch ~ April 10

3/21/2012
4/21/2007
2016
March 24 in Warwick
Seems like dead winter when hatch
Tiny caterpillars wriggle into buds
All eggs hatch in ~ 8 days

- Caterpillars don’t feed while entering buds
10 days after eggs start hatching
Late May mature larvae drop to ground to pupate
Form pupae inside pupal cell
Winter moth

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Early November – set up tree bands
Shelter Tree
North Attleboro, MA
Remove bands in March
Eggs congregated below band
How to see the eggs...
Eggs turn blue ~2 days before hatching.
Monitoring network

Email list for winter moth egg hatch

hhf@uri.edu
Winter moth

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Spray apples, pears, blueberries when eggs start hatching

• Stop caterpillars from entering buds
• Imidan, Sevin, Malathion, Delegate fine
• Entrust (OMRI spinosad) fair
• Bt needs to be ingested, so not effective against newly hatched caterpillars

• If heavy rain before all eggs hatch, spray again, otherwise wait till buds open and see if need to spray again.
Adding dormant oil *may* help
Additional **fruit** sprays

- Don’t spray again until buds are open and caterpillars climbing around
- Caterpillars safe inside these buds....
- Same list of insecticides plus Bt
Spray landscape trees when buds open

- Bt products good choice
  - DiPel, Thuricide, Biobit
  - Best against young larvae
  - Lasts 3-5 days

- Conserve (spinosad)
Additional sprays depend on:

- Hugh population?
- Woods nearby?
- Insecticide used
Using tree wraps for control

• Perhaps work on isolated tree – not close to other trees
• Need multiply bands per tree
• Homemade band – insulation, duct tape, petroleum jelly
• Need to spray oil on trunk in spring to suffocate eggs
Kingston, RI

Set up bands in early November.

Doubt it worked well.
Upper band: 138 female winter moths

Lower band: 207 female winter moths
Homemade tree wraps
See only 2 females
If wrap tree in Fall be sure to spray trunk with oil in Spring before eggs hatch.
Winter moth

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- **Biocontrol**
Winter moth Biological Control

- Parasitoid - *Cyzenis albicans*
Eggs are laid on surface of injured leaves

Photo: Thijs de Graaf
Caterpillars accidentally eat eggs
Winter moth biocontrol

• Nonparasitized larva – moth emerges in winter

• Parasitized larva – fly emerges following spring
Establishment:
- 17 of 49 sites established
- All 2005 – 2011 sites est.
- Highest % in Wellesley site
Parasitic fly release sites

• 2011 – Warwick, Goddard Park
• 2013 – Jamestown & Bristol
• 2014 – South Kingstown & Cumberland
• 2015 – Little Compton & Lincoln
Late May
collect larvae to check for parasitism
Nova Scotia - 5 years to recover flies
– then 2 years to get high levels of parasitism
– In MA, took 5 years to recover flies...
Before I forget...
Runs May 1 – December 31
<table>
<thead>
<tr>
<th><strong>Farm Listings</strong></th>
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| **1. Appleland Orchard**  
135 Smith Avenue, Greenville  
401.949.3690 applelandorchardri.com  
Open: Daily 8am - 6pm  
Late August - December  
Map location: [C0](#) |
| **9. Festival Farm**  
2 Canonchet Road, Hope Valley  
401.742.5575 festivalfarmri.com  
Open: Wknds. 9am - 6pm  
Self-serve Mon - Fri, 9am - 5pm  
Map location: [A2](#) |
| **17. Magnolia Ridge Farm**  
312 Tomaquag Road, Ashaway  
401.315.5753 magnoliaridgefarm.net  
Open: May - Oct 31, Tues - Sun 10am - 6pm  
Nov & April, Tues - Sun 10am - 4pm  
Map location: [A2](#) |
| **18. Morris Farm**  
2779 Warwick Avenue, Warwick  
401.738.1036 Open: April - June, 9am - 5pm, July - Oct, 9am - 6pm  
farmfresh.org/food/farm.php?farm=15  
Map location: [F4](#) |
| **25. Scituate Nursery**  
767 Hartford Pike, N. Scituate  
401.934.0581 scituatenursery.com  
Open Daily: April - December  
Map location: [J5](#) |
| **26. Steere Orchard**  
150 Austin Ave, Greenville  
401.949.1456 steereorchard.com  
Open: 9am - 5pm w/kinds in August and Daily, September - January  
Map location: [C7](#) |
| **27. Sweet Berry Farm**  
915 Mitchell's Lane, Middletown  
401.847.3912 sweetberryfarmri.com  
Open Daily: 8am - 7pm  
mid April - December 31  
Map location: [J4](#) |
| **28. Walker's Roadside Stand**  
251 West Main Rd, Little Compton  
401.683.4719 faceboook.com/walkersstand  
Open Daily: 8am - 6pm  
June 21 - October 31  
Map location: [D12](#) |
| **29. West Beach Farm**  
18 West Beach Road, Charlestown  
386.628.7143 facebook.com/westbeachfarm  
10am - 6pm, Wknds May & June, Daily June 20 - Labor Day, Tues - Sun Labor Day - Oct  
Map location: [C1](#) |
| **30. Windmist Farm**  
71 Weeden Lane, Jamesport  
401.423.9767 windmistfarm.com  
Open: Fri 1 - 6pm, Sat 10am - 4pm, Sun 11am - 4pm, July & Aug also Tues - Thurs 1 - 6pm  
Map location: [F1](#) |
| **31. Wright's Dairy Farm & Bakery**  
200 Woonsocket Hill Rd, N. Smithfield  
401.767.3014 windtressdairyfarm.com  
Open: Mon - Sat, 8am - 7pm  
Sunday 8am - 5pm, Year-Round  
Map location: [O6](#) |
| **32. Young Family Farm**  
260 West Main Road, Little Compton  
401.635.0110 youngfamilyfarm.com  
Open: May 21 - Oct 31 Thurs - Sun, 9am-6pm, 7 days July/Aug 9am-7pm  
Map location: [D2](#) |