

## **Insect Pests of 2017...and Beyond!**

Presentation to the 105<sup>th</sup> Annual Mass Tree Wardens & Foresters Association Conference

### Euonymus Caterpillar

- *Yponomeuta cagnagella*
- European origin – reported in Ontario in 1967 and subsequently in Michigan, New York, Massachusetts, and others
- Hosts: *Euonymus europaeus* (European spindle tree), *E. kiautschovicus* (spreading euonymus), *E. alatus* (winged euonymus/burning bush), and *E. japonicus* (Japanese euonymus)
- Damage: defoliation caused by caterpillar stage; plants coated in webbing as they feed
- Life Cycle: according to the literature, they overwinter as a hatched larva beneath their eggshell; larvae feed at bud break to late June; adults emerge by July, mate, and lay eggs. One generation per year.

### 2017 Highlights

- Updates for winter moth, gypsy moth, and emerald ash borer
- A new confirmation (in MA) of an “old” pest: shortneedle evergreen scale (armored scale)
- Interstate movement of the non-native spotted lanternfly

### Winter Moth Update:

- *Operophtera brumata*
- Egg hatch observed around April 6, 2017 (Franklin, MA)
  - Early report with other locations in the state not yet hatching at the time; hatch extends over a period of multiple days
  - Ex. Hanson, MA egg hatch was not observed until April 14, 2017 (38 GDD’s accumulated at the time)
- Hatch typically occurs around late March into early-mid April
  - Varies depending upon temperature
  - Roughly between 20-50 GDD’s, base 50°F
    - Locations near Franklin, MA with:
      - April 5<sup>th</sup>: Hanson, MA: 19 GDD’s
      - April 6<sup>th</sup>: Wrentham, MA: 18 GDD’s
  - Pupation by late May/early June
    - Record low pupal numbers
  - Adults seen around November 16, 2017
    - Record low adult numbers
- Elkinton Lab is very optimistic about the overall impact of *Cyzenis albicans*
- Have released at 43 sites in MA, CT, RI, and ME
  - 33 sites have established fly populations
  - Data from the following Massachusetts towns indicate that as *Cyzenis* parasitism rates increase, winter moth densities are decreasing:

- Wellesley, MA
- Hanson, MA
- Yarmouth, MA
- Hingham, MA
- Wenham, MA
- Falmouth, MA
- Even though parasitism of winter moth pupae ranges from 15-48% (typically not enough to lower a pest population), it seems other key players are able to step in and make an impact, such as:
  - Predatory beetles (ground beetles – 29 different species)
  - Ichneumonid pupal parasitoid (*Pimpla spp.*; may be an undescribed species with multiple generations per year)

### Gypsy Moth Update:

- *Lymantria dispar*
- Egg hatch observed around April 26, 2017 (Belchertown, MA)
- Hatch typically occurs around the first week in May
  - Varies depending upon temperature
  - Roughly between 90-100 GDD's, base 50°F
    - April 26<sup>th</sup>: Amherst, MA: 94 GDD's
    - April 26<sup>th</sup>: South Amherst, MA: 100.5 GDD's
  - Dispersal of larvae by May 3, 2017 (Belchertown, MA)
    - Widespread defoliation
  - Epizootic of *Entomophaga maimaiga* occurred around June 23, 2017 and through that weekend
    - Dead caterpillars visible through July
- Valerie Pasquarella et al. 2017
  - Postdoctoral research associate at Northeast Climate Science Center (UMass)
  - Using Landsat images, Pasquarella and colleagues mapped defoliation due to gypsy moth
    - Landsat 4, 5, 7, and 8 data to create images of the 2016-2017 gypsy moth defoliation, using satellite imagery...
    - Imagery is 30 meter resolution; cloud cover had to be corrected for
    - See maps: <https://www.umass.edu/newsoffice/article/using-landsat-images-postdoctoral-fellow>
- MA Department of Conservation and Recreation aerially mapped defoliation caused by gypsy moth and found 923,186 acres of defoliation in the 2017 outbreak
  - Also conducted a survey of egg masses
    - all *visible* egg masses seen on 10 trees per 1 acre plots across the state; any tree species was used; egg masses were determined to be from 2017 females
- Although we hope the gypsy moth population will be *much lower in most locations in MA* in 2018, it is wise to scout for egg masses as this pest will not *entirely* disappear this season in all locations

### Emerald Ash Borer Update:

- *Agrilus planipennis*
- New county and town detections made in 2017

- New Counties:
    - Norfolk County: 6 adult beetles in 2 green panel traps (host plant volatiles and pheromone lures) in Brookline, MA; exit holes and galleries in Dedham, MA trees
    - Hampshire County: exit holes and galleries in Easthampton, Northampton, and South Hadley trees
  - New Towns:
    - Berkshire County (2012 – Dalton): West Stockbridge, MA
    - Essex County (2013 – North Andover): Georgetown, MA
    - Middlesex County (2015 – Newton\*): Shirley and Waltham, MA
- \*Detection made with biosurveillance using *Cerceris fumipennis*

### Shortneedle Evergreen Scale Detected:

- *Dynaspidiotus tsugae* (previously referred to as *Nuculaspis tsugae* as reported by McClure, 1987)
- Not to be confused with the *native* circular hemlock scale (*Abgrallaspis ithacae*)
- Non-native, from Japan, Korea, and Russian far-east
  - Reported in NJ in 1910 (Johnson and Lyon, 1991)
  - CT, MD, NJ, RI reported for USA (Kosztarab, 1996, ScaleNet)
  - Normark Lab at UMass confirmed: NH
- Sample sent to the UMass Plant Diagnostics Laboratory
  - Collected: 11/6/2017
  - Location: Barnstable County, MA
  - Sample Host: White spruce
    - Homeowner with various spruce species, transplanted 9 years ago (15 ft. tall approx. when transplanted); 9 original plants, 7 remain
    - Symptoms began 2 months prior; needle discoloration and drop
  - Worked with Normark Lab to confirm the MA find as well
- Host Range: *Abies* (fir), *Cedrus* (cedar), *Chamaecyparis* (false cypress), *Juniperus* (juniper), *Picea* (spruce), *Taxus* (yew), *Thuja* (arborvitae), and *Tsuga* (hemlock).
- Damage: leaf yellowing, premature needle drop, sometimes tree death
  - In Japan, trees under stress reportedly most impacted
  - In CT, a severe pest of native hemlock, however Japanese hemlock species with higher scale populations
- Life Cycle: based on information from Johnson and Lyon (1991) and McClure (1978) from studies completed in CT. Second instar nymphs (immatures) overwinter; adults present in April and females with eggs by early May; 1<sup>st</sup> generation crawlers present late May to early July; second generation of eggs found with females by early August; 2<sup>nd</sup> generation crawlers present early August to early November; 5 developmental stages for males, 3 known for females; two generations per year.
- McClure, 1988 reports infested hemlock fertilized with nitrogen had increased scale populations
- Management:
  - Natural Enemies: An encyrtid wasp parasite, *Aspidiotiphagus citrinus*, but Johnson and Lyon note that on ornamentals, this wasp rarely develops in sufficient numbers to keep the scale population low enough. Other natural

- enemies reported include a certain parasitic wasp in the family Aphelinidae, three other encyrtid wasp parasitoid species, and others. Any chemical management options, if employed, should seek to preserve the populations of these natural enemies.
- Cultural/Mechanical Management: If the infestation is caught early, and the scales are not present throughout the entire host plant (but perhaps on one or few localized branches), infested branches may be cut and removed if this action does not disfigure or reduce the overall health of the plant. Any removed branches should be burned if safe or possible to do so. Do not throw in a compost/yard waste area near susceptible hosts.
- Chemical Management: Chemical management of this species (as with many other armored scale insects) is difficult in terms of timing of the application. Because the insects are usually protected by a waxy coating (test), they can be missed by active ingredients in insecticides that require contact with the organism to be effective. Targeting the mobile stage of the insect (the immature crawlers) is helpful as this is the most vulnerable life stage. Late June-early July has been reported from CT (McClure, 1987) to be the best time to target the crawler stage of this insect, however crawlers may be active over a period of weeks, and peak crawler activity varies with site location and is difficult to predict. Dormant oil applications (according to label instructions to avoid host plant injury at certain temperatures and for certain hosts) have been shown to be effective for decreasing populations of this insect by McClure, 1987. Applications were made in that experiment in CT in April (a single application at each experimental location). Some professionals report varying success with dormant oil applications, historically, for this pest. When making applications of insecticides, be sure to read, understand, and follow all label instructions for safety for the applicator and the environment. Chemical active ingredients that may be used for the management of this insect include but are not limited to: acephate, acetamiprid, carbaryl, dinotefuran (armored scales; state restricted use), horticultural (dormant) oil, and insecticidal soap. Follow all label instructions for safety and proper use, including reducing risks to pollinators.

#### Spotted Lanternfly Update:

- *Lycorma delicatula*
- **Not yet known to Massachusetts**
- First found in southeastern Pennsylvania (Berks County) September 22, 2014
- Native to parts of China, India, and Vietnam (introduced invasive in South Korea, pest of grapes and peaches)
- Nov. 20, 2017: a single SLF female found in Delaware (unclear if it is established or a hitchhiker)
- Nov. 29, 2017: a single, dead SLF found in New York, south-west of Albany (interstate shipment)

- Hosts: 70+species including tree of heaven (*Ailanthus altissima*), apple (*Malus spp.*), plum, cherry, peach (*Prunus spp.*), grape (*Vitis spp.*), pine (*Pinus spp.*), maple (*Acer spp.*), serviceberry (*Amelanchier canadensis*), black birch (*Betula lenta*), paper birch (*Betula papyrifera*), hickory (*Carya spp.*), dogwood (*Cornus spp.*), beech (*Fagus spp.*), ash (*Fraxinus spp.*), walnut (*Juglans spp.*), tulip poplar (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*), sycamore (*Platanus spp.*), aspen (*Populus spp.*), oak (*Quercus spp.*), willow (*Salix spp.*), *Sassafras spp.*, Japanese snowbell (*Styrax japonicus*), linden (*Tilia spp.*), and elm (*Ulmus spp.*).
- Life Cycle: Information based on observations completed in Pennsylvania. One generation per year. Partial metamorphosis: egg, nymph, adult. Females lay masses of eggs (at least 2 each) with 30-50 eggs per mass; coat them in a waxy secretion that is initially white, then gray, and cracks over time (like dried mud). Masses 1-1.5 inches long and ½ - ¾ inch wide. Eggs present in late September and October through June (after hatch); nymphs hatch from eggs in beginning to late April to early May (nymphs white in color when first emerge; tiny). Four nymphal instars. Instars 1-3 are black with white spots; present from May through the end of June. 4<sup>th</sup> instar is present the first week in July and are red and black with white spots. Adults present mid-July and live until the first couple of hard freezes get them (Nov/Dec in PA).
- Damage: use piercing-sucking mouthparts to feed. Wounds in trees weep sap; excessive amounts of sugary waste are secreted; attractive to ants, bees, wasps, etc. Sooty mold develops; hosts may take on a fermented odor; tree of heaven is a preferred host, but eggs are laid just about anywhere.
- **If spotted lanternfly is suspected, report it here:**  
<https://massnrc.org/pests/report.aspx>
- **New SLF Fact Sheet Available Online:** <https://ag.umass.edu/landscape/fact-sheets/insects-mites>

## Further Resources:

UMass Extension Landscape, Nursery, and Urban Forestry Program:

<https://ag.umass.edu/landscape>

- Fact sheets
- Newsletters – Hort Notes and Garden Clippings
- Education and Events
- ...and more!!

Landscape Message: <https://ag.umass.edu/landscape/landscape-message>

- FREE
- Seasonal updates about insect and disease pests
- Growing degree day reports across Massachusetts
- Scout reports across MA
- ...and more!!

Hort Notes: <https://ag.umass.edu/landscape/newsletters-updates/hort-notes>

- FREE
- Hot topics

- Questions and answers
- Trouble maker of the month
- Plant of the month
- Upcoming events

**UMass Plant Diagnostics Laboratory:** <https://ag.umass.edu/services/plant-diagnostics-laboratory>

**Soil and Plant Nutrient Testing Laboratory:** <https://ag.umass.edu/services/soil-plant-nutrient-testing-laboratory>

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Further questions about these insect pests of trees and shrubs or others? Please contact:

Tawny Simisky  
Entomology Specialist  
UMass Extension

107 French Hall  
University of Massachusetts  
230 Stockbridge Road  
Amherst, MA 01003  
Office: 413-545-1053  
[tsimisky@umass.edu](mailto:tsimisky@umass.edu)