Asian gypsy moth detection and response in the Pacific Northwest, 2015 and 2016

Clinton L. Campbell, Ph.D., and Timothy B. St. Germain, USDA APHIS PPQ, Federal Way, Washington

The second-largest Asian gypsy moth detection and response in the United States, and the latest in 15 years in Washington state, took place in the Pacific Northwest in 2015 and 2016. The response effort included more separate treatment areas than have ever been necessary and is being followed up by intensive and extensive multiyear delimiting trapping beginning in 2016. Trapping results this season portend a successful eradication if results hold for two more years. A larger geographic perspective in terms of how this invasive species is and should be viewed for the United States is included.
Asian gypsy moth detection and response in the Pacific Northwest, 2015 & 2016

Clinton L. Campbell, Ph.D.
Timothy B. St. Germain
USDA APHIS PPQ, Federal Way WA

Alaska Invasive Species Conference
Fairbanks, Alaska
October 27th, 2016
• Introduction
• background & history
• identification
• life cycle
• environmental impacts
• economic impacts
• gypsy moth program
• monitoring
• control options
• a larger geographic perspective
• summary
Introduction
• Gypsy moth is the classical invasive species
• Gypsy moth is a very serious defoliator of hundreds of trees and shrubs
• It requires many resources to prevent its establishment here.
Background & History
Background & History

Gypsy moth (*Lymantria dispar*)
- two forms: European and Asian - with important differences

**European form = European Gypsy Moth**
- Female cannot fly
- Caterpillars (larvae) feed on hundreds of different trees and shrubs, but prefer oaks

In 1869...
The Generally Infested Area

European Gypsy Moth (Lymantria dispar) North America quarantine

Map Key
- Entire county quarantined prior to 2005
- Portion of county quarantined
- Counties quarantined in 2005
- Counties quarantined in 2006
- Counties quarantined in 2007
- Counties quarantined in 2008
- Counties quarantined in 2009
- Counties quarantined in 2010
- Counties quarantined in 2011
- Counties quarantined in 2012
- Counties quarantined in 2013
- Counties quarantined in 2014
- Counties quarantined in 2015
- Canadian quarantined area
Gypsy moth (*Lymantria dispar*)
- Again, two forms: European and Asian - with important differences

**Asian form = Asian Gypsy Moth**
- Female *can* fly – and can fly really far.
- Caterpillars (larvae) of AGM feed on even more kinds of trees and shrubs than European form.
- This means that an infestation can spread quickly

In 1991…
British Columbia, 2012
British Columbia, 2012
Identification
Identification
Life cycle
Life cycle

- Egg masses overwinter
- Larvae emerge in Spring
- Pupal stage early Summer
- Male & Female Mid-late Summer

USDA
Environmental impacts
Environmental impacts
Environmental impacts
Environmental impacts
Environmental impacts
Environmental impacts
Environmental impacts

In the East, the gypsy moth's favorite trees include apple, speckled alder, basswood, gray and river birch, hawthorn oak, poplar, and willow. Less desired but still attacked are black, yellow, and paper birch, cherry, cottonwood, elm, blackgum, hickory, hornbeam, larch, maple and sassafras. Older gypsy moth larvae devour the foliage of several species that younger larvae normally avoid, such as hemlock, southern white cedar, and the pines and spruces native to the East.
Gypsy moth is a polyphagous insect, the host range of the North American strain of gypsy moth consists of over 300 species of trees and shrubs compared to the Asian strain which has a host range that exceeds 500 species.

### Preferred Hosts:
- *Quercus* and *Populus*

### Other Hosts:
- Lodgepole
- Ponderosa pines
- Western larch
- Spruce
- Douglas-fir

### Riparian Habitat Hosts:
- *Salix*, *Alnus* and *Betula*
Environmental impacts

Various reports indicate that gypsy moth larvae can feed on at least 500 species of plants that include trees, shrubs, and vines.

United States Department of Agriculture
Combined Forest Pest Research and Development Program
Home and Garden Bulletin
Gypsy Moth Handbook

The Homeowner and the Gypsy Moth: Guidelines for Control

Michael L. McManus, David R. Houston, and William E. Wallner
Environmental impacts

Defoliation events
- Weaken forests
- Increased potential for damage by other forest pests
- Cascading effects:

GM Outbreaks → Riparian Defoliation

stream shading decreases → stream temperatures increase → fish and other aquatic fauna are affected
Economic impacts
Economic impacts

If gypsy moth becomes established in the Pacific Northwest, expect the following:

1. Defoliation causes economic and environmental damage = cost of damage
2. Control of the damage, aka suppression = cost of control
3. Canada and uninfested states will quarantine the infested area = cost of regulation

The first two costs vary by year; the 3rd never does.
Gypsy Moth Program
European and Asian Gypsy Moth

In Washington and Oregon, the field work is conducted by the State Department of Agriculture in the form of surveys and eradication. It’s carried out under cooperative agreements. Apart from agreement administration, APHIS’ role at the local level includes helping rework the Gypsy Moth manual and, in 2015, the Environmental Assessment for AGM.
Asian Defoliating Moths

In Washington, the primary work is conducted by the Washington State Department of Agriculture in the form of Port area surveys carried out under a cooperative agreement. In recent years, this has utilized Farm Bill funding. Targets are typically Rosy Gypsy Moth, Nun Moth, Siberian Moth, and Asian Gypsy Moth.
Monitoring
• Typically about 20,000 traps
• June to October
• Gypsy moth trap and lure are one of the most effective detection combinations in use today
Control options
Control options

- Do nothing
- Biological insecticide
- Other insecticides
  - Diflubenzuron
  - Gypcheck
- Mating disruption
- Mass trapping
Recent control

Yacolt, WA 2015  Second treatment
Recent control

Port of Vancouver, 2016
Recent control

Lacey, WA 2016
2016 acres treated:

- WA – ca. 10K acres
- OR – ca. 8K acres
Post-treatment Delimiting Trapping, 2016 - 2018

- WA – 10,477 traps
- OR – 3,086 traps
Since 1979, 101 Gypsy Moth Eradication Treatments have been Conducted in Washington

- 69 treatments have been by ground,
- 26 by air, and
- 6 have been combination ground-air treatments
A larger geographic perspective
Game Changer! Inauguration of Expanded Panama Canal ushers in new era of Global Trade

26 Jun

The Expanded Panama Canal is now officially open for business. During today’s official inauguration ceremony, Panamanian President Juan Carlos Varela and Panama Canal Administrator and CEO Jorge L. Quijano spoke to a crowd of more than 25,000 jubilant Panamanians, Canal employees, heads of state and dignitaries from around the world, Canal customers, shipping and trade
Summary

• Very serious pest, both forms, but Asian form is worse – far worse
• Establishment would mean environmental & economic damage with some costs being never-ending
• Good tools are used to detect and control incipient populations
• Cooperative effort needed by all of us
Questions...