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You Ain't From Around Here

Exotic Species of the Quarter: Gypsy Moth (*Lymantria dispar*)

By: Jennifer Gagnon, *Virginia Tech Dept. of Forestry*

I will be featuring an invasive species in each newsletter. This section will provide resources to help you identify and control these plants and insects, hopefully before they become a problem!

Exotic invasives are non-native plants and insects that are able to thrive and spread aggressively outside their natural range. When spread is extensive, they can alter ecosystem function by replacing native species, changing forest structure, decreasing forest productivity and biodiversity. Some key characteristics include: prolific seeding or reproduction, efficient dissemination, adaptability to different environments, rapid growth, and lack of natural controls. Landowners can help stop invasives before they get out of control by 1. inspecting their property regularly, 2. Maintaining a healthy forest with minimal disturbance, 3. treating invasives as soon as they are detected and 4. rehabilitating sites after eradication.

The European gypsy moth is a critter that, unfortunately, is familiar to the majority folks in Virginia. As with most exotic species, the gypsy moth was brought to the United States in the 1860's with good intentions – to breed them with native silk worms to increase silk production. Although the breeding experiment failed, the species didn't. Imported to Massachusetts, the gypsy moth is now well-established in all the other northeastern states and is munching its way into North Carolina, Virginia, Kentucky, West Virginia, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota.

Since 1971, the gypsy moth has defoliated over 74 million acres of forestland, resulting in \$22 million annually in damage and management costs!! Generally, a single defoliation event will not kill a tree; however, two to three continuous years of defoliation, in conjunction with other stresses (e.g., drought) usually result in tree death. Gypsy moth populations are cyclical and may be affected by weather, abundance of natural predators, and extent of control operations. For example, in 2001, 440,000 acres were defoliated; in 2005, only 3,500 acres were. With no control measures at all, up to 15,600 square miles of forest can be invaded in a single year.

There are four stages in the life cycle of the gypsy moth: egg, larva (caterpillar), pupa (cocoon), and moth, and only one generation per year. The egg and larval stages are the most important, in terms of control and damage. Egg masses (each of which contain up to 1000 eggs!) are present from August through March. Gypsy moths are NOT tent caterpillars – their eggs are laid in flat, velvety-feeling yellow-brown masses, which, in forested areas, can usually be found on tree stems. Adult female gypsy moths are not able to fly (too heavily burdened with eggs) and don't move more than 50 feet during their entire lifetime, so they will lay their eggs wherever they can – this includes: trees, outdoor furniture, vehicles, boats, toys, gardening tools, firewood and plants. Humans moving these objects also move the eggs – and are the cause of most of the spread!

The larvae hatch out in April/May. The caterpillars emit a single strand of silk from which they dangle until the wind disperses them. Dispersal is generally close to the eggs mass, but can be up to a mile away. Gypsy moth larvae are insatiable hardwood leaf eaters (their favorite flavor? oak); in extreme cases, when populations are very high, they will even resort to eating grass and pine needles. They spend the next four to six weeks eating and growing, reaching lengths of 1.5 to 2.5 inches before they form cocoons and enter the pupal stage, which lasts 10-14 days.

The final life stage is the moth. The moths do not cause any direct damage, as they only live long enough to mate and lay eggs. The females release a pheromone to attract the males, who fertilize the eggs. After mating, the adult moths die. Eggs over-winter and larvae hatch out in the spring, and the life cycle begins again.

How to Identify Gypsy Moth

Always be on the lookout for the four life stages of the gypsy moth!

Look for: **Egg Masses**
August through March.

- Yellow-brown
- Velvety
- 1.5 x 0.75 inches
- Can be attached to ANY outdoor item



Look for: **Pupae (cocoons)** mid-June through mid-July

- Dark brown/black
- Larger pupae will be female moths; smaller pupae will be males

Look for: **Larvae (caterpillars)** April through June

- Five blue followed by 6 red sets of dots on back
- 1.5 to 2.5 inches long



Look for: **Moths** June through July

- Females are white with dark brown markings
- Males are dark brown, smaller, with markings similar to females
- Males have feather-like antennae



Photo credits (clockwise): Jim Occi, BugPics; USDA APHIS PPQ Archives, USDA APHIS PPQ; CT Agricultural Extension Station Archives, CT Agricultural Extension Station; Jim Occi, BugPics

How to SLOW THE SPREAD

Since early attempts at gypsy moth eradication proved to be costly, detrimental to other species, and ineffective, efforts have been redirected to slowing the spread of the critters into new territory.

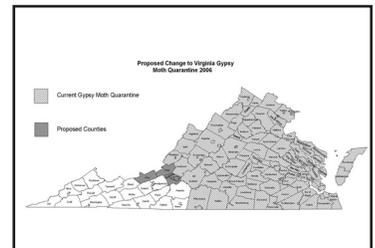
As a private landowner, the main thing you can do to prevent the spread is to check for egg masses before you move any and all items from an infected area to a non-infected area (see quarantine map). Egg masses can be difficult to find – on tire axles, undersides of vehicles, etc. If you do find egg masses, coat them with soapy water or biodegradable oils (to kill the larvae in the eggs), then scrape them into a disposable container.

If you notice signs of extensive gypsy moth infestation on your property, contact your county agriculture agent (www.ext.vt.edu/offices), VDACS (www.vdacs.virginia.gov), Virginia Department of Forestry (www.dof.virginia.gov), or U.S. Department of Agriculture (www.aphis.usda.gov). These agencies are equipped to chemically treat large areas. Treatments include: Disrupt® II, which is a synthetic pheromone, similar to the one emitted by the female moths to attract males. Releasing this synthetic pheromone confuses the males and prevents them from finding the females, thus disrupting mating; Bacillus thuringiensis (Bt), a natural soil bacteria, is toxic to gypsy moth larvae; Gypchek®, is a naturally occurring virus which is toxic to the larvae; and Dimilin, an insect growth inhibitor, which is used for moderate and high larval populations.



Aerial spraying to slow the spread. Photo by: Gerald Lenhard

In addition to chemical treatments, regulations and quarantines are also effective in slowing the spread. Forest products, such as logs, posts, wood chips and firewood, nursery stock, outdoor household articles, and mobile homes and offices are all regulated items, meaning that they must be inspected before they can be moved from a quarantined area to a non-quarantined area. A quarantined area has a well-established and reproducing population, and includes all or portions of 19 mostly northeastern states, including portions of Virginia.



Quarantined and proposed quarantine areas in Virginia

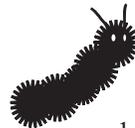
References & Additional Information

- Virginia Department of Agriculture and Consumer Services. www.vdacs.virginia.gov
 United States Department of Agriculture, Animal and Plant Health Inspection Service. www.aphis.usda.gov
 USDA Forest Service. www.fs.fed.us
 Virginia Cooperative Extension Service www.ext.vt.edu
 Gypsy moth in Virginia. www.gypsymoth.ento.vt.edu/vagm/index.html
 The Bugwood Network. www.bugwood.org
 Slow the Spread Gypsy Moth Project. <http://www.gmsts.org/operations/>

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YUM!



Top 20 Faves (from a gypsy moth perspective!)

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| 1. white oak | 11. black oak |
| 2. California red oak | 12. paper birch |
| 3. scarlet oak | 13. bigtooth aspen |
| 4. sweet gum | 14. chestnut oak |
| 5. American basswood | 15. tan-oak |
| 6. southern red oak | 16. canyon live oak |
| 7. quaking aspen | 17. post oak |
| 8. western larch | 18. willow oak |
| 9. northern red oak | 19. water oak |
| 10. laurel oak | 20. eastern hophornbeam. |

