Oak Processionary Moth

Thaumetopoea processionea

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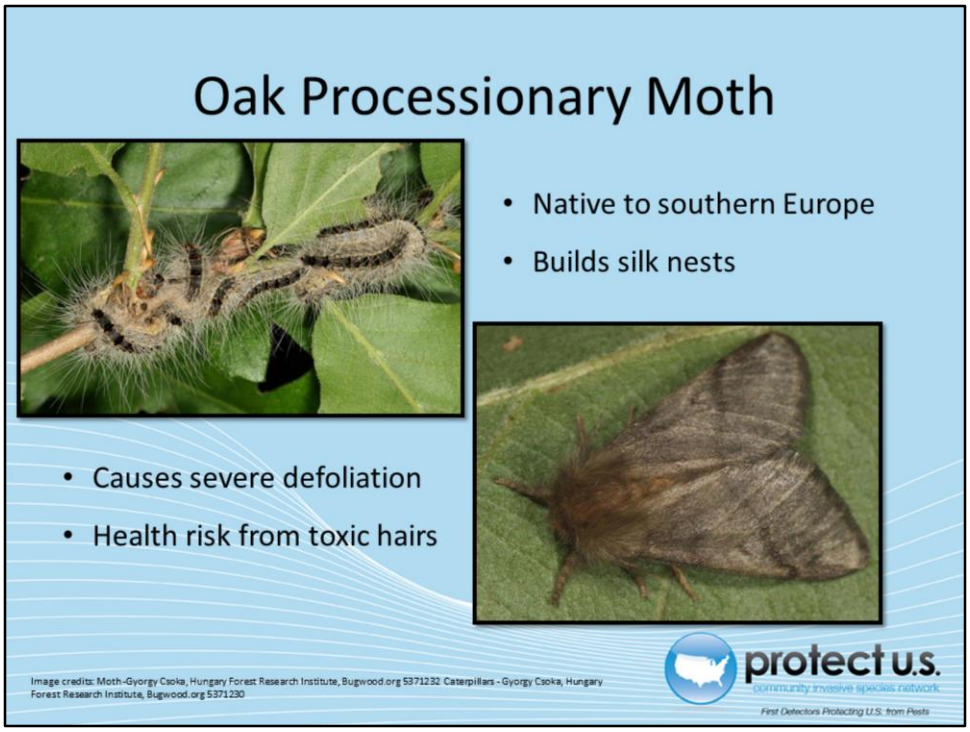
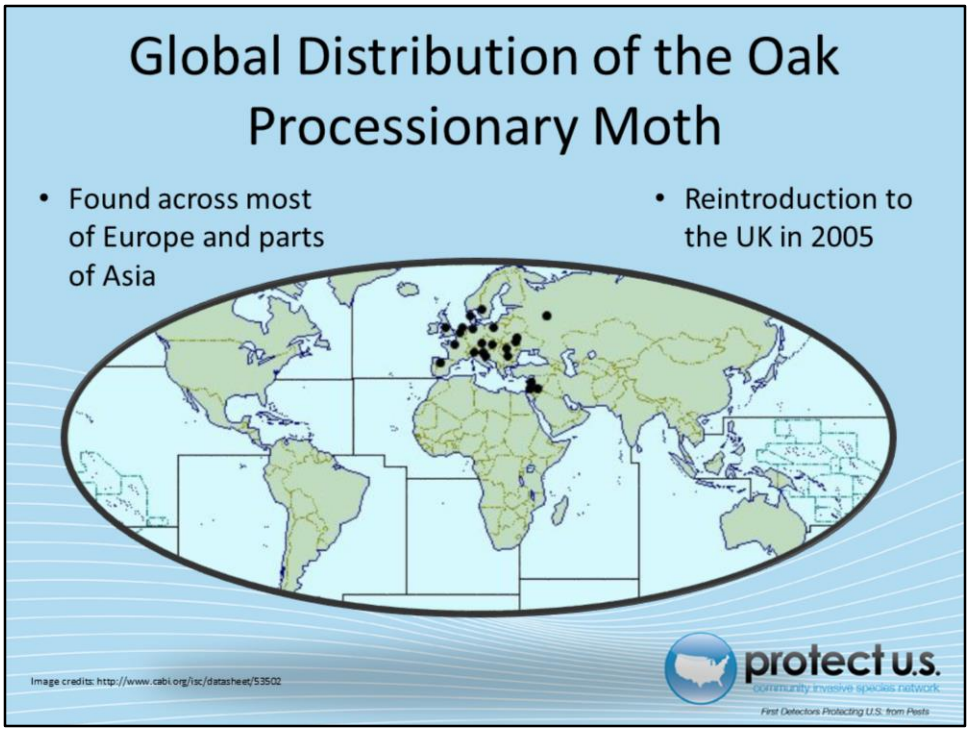


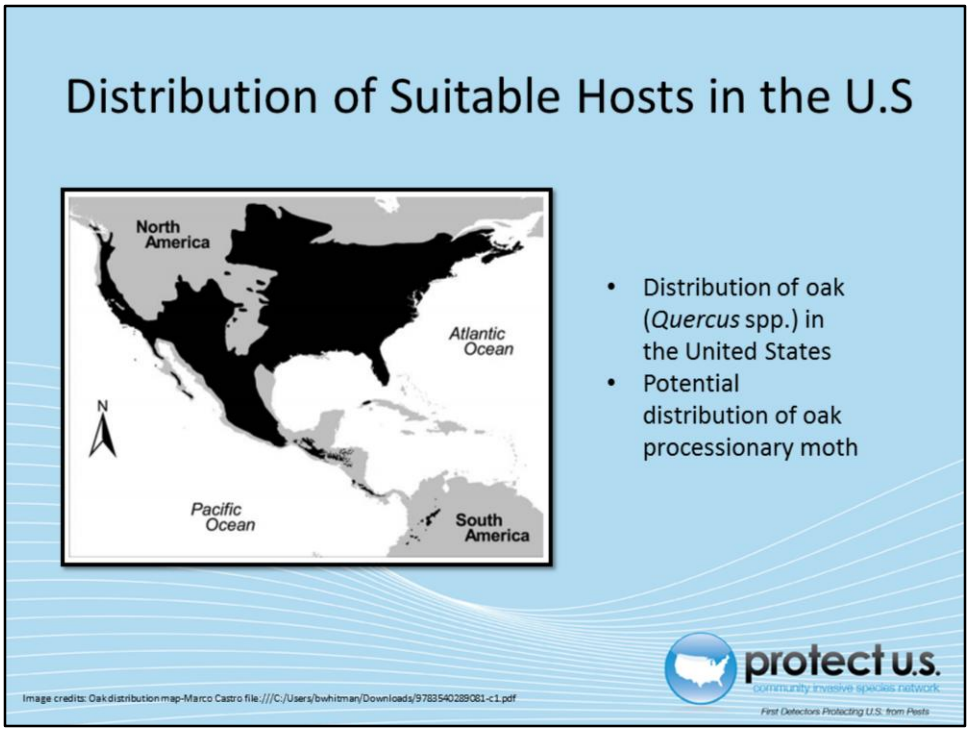
The scientific name of this moth is *Thaumetopea processionea* (Linnaeus). It has been known previously under the names *Cnethocampa processionea* (Linnaeus), *Liparis processionea* (Linnaeus), and *Phalaena processionea* (Linnaeus). Other common names include cluster caterpillars, oak processionary, oak processionary caterpillar, procesionaria de la encina, processionnaire du chene, Eichen prozessionsspinner, Processsionaria della quercia, and the EPPO code THAUPR (1 and 12).

Oak processionary moth is named for how they move in nose to tail processions. It is native to southern Europe, and is found in almost all European countries. The moths almost exclusively feed on oak trees, and build distinctive white silk nest on trunks and branches (3). Oak processionary moth can cause severe defoliation of trees and reduce tree health. Another major concern is that the caterpillars have poisonous hairs (1). The hairs contain thaumetopoein, a toxin that can cause itching, rashes, eye irritation, sore throat, and difficulty breathing in both humans and animals (3). These hairs, or setae, can remain in the environment and cause symptoms for at least a year (7).



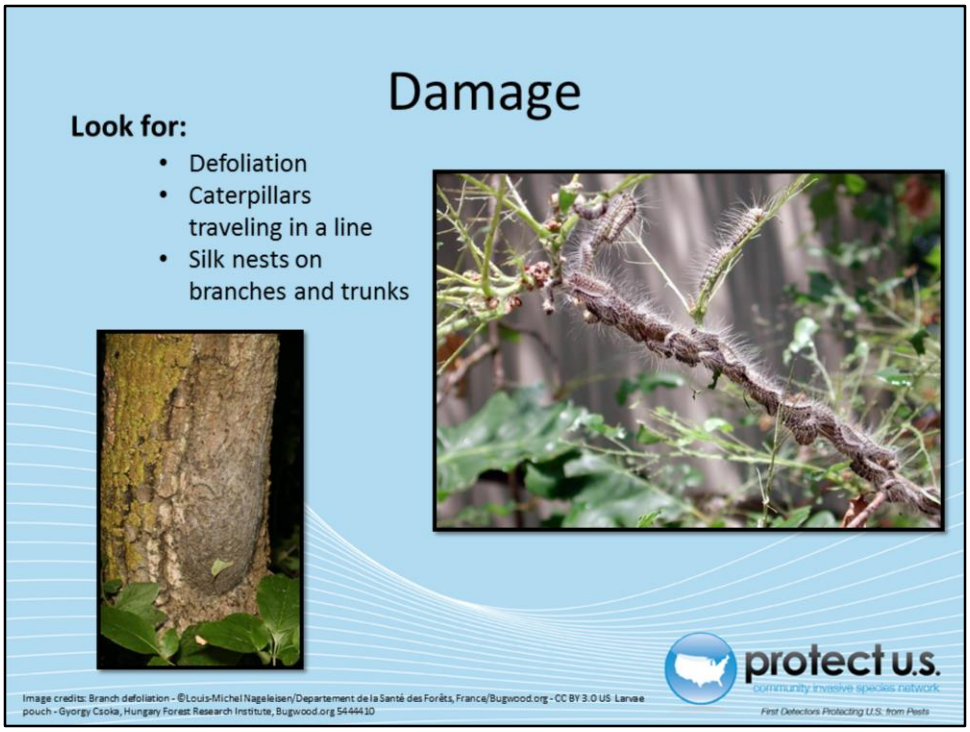
Oak processionary moth is native to southern Europe, but is found across Europe and in some parts of Asia. It is established in: Austria, Belgium, Bulgaria, Croatia, Denmark, former USSR, France, Germany, Israel, Italy, Jordan, Lebanon, Moldova, Netherlands, Poland, Romania, Slovenia, Spain, Sweden, United Kingdom, Channel Islands, and Ukraine (12).

The moth was recently introduced to Great Britain in 2005 (3). However, this is believed to be a reintroduction from a previous range that the moth had sometime before 1700 (5).

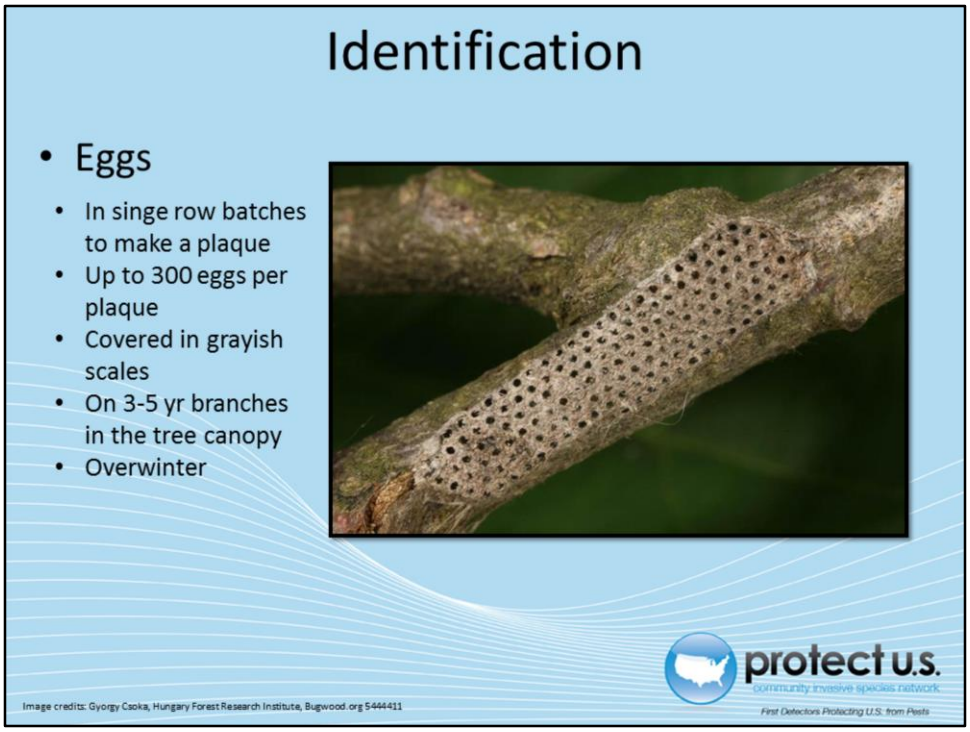


Oak species, *Quercus* spp., are the primary host for *T. processionea.* Oak trees are widely distributed in the United States (4). The image shows the distribution of suitable hosts in North America.

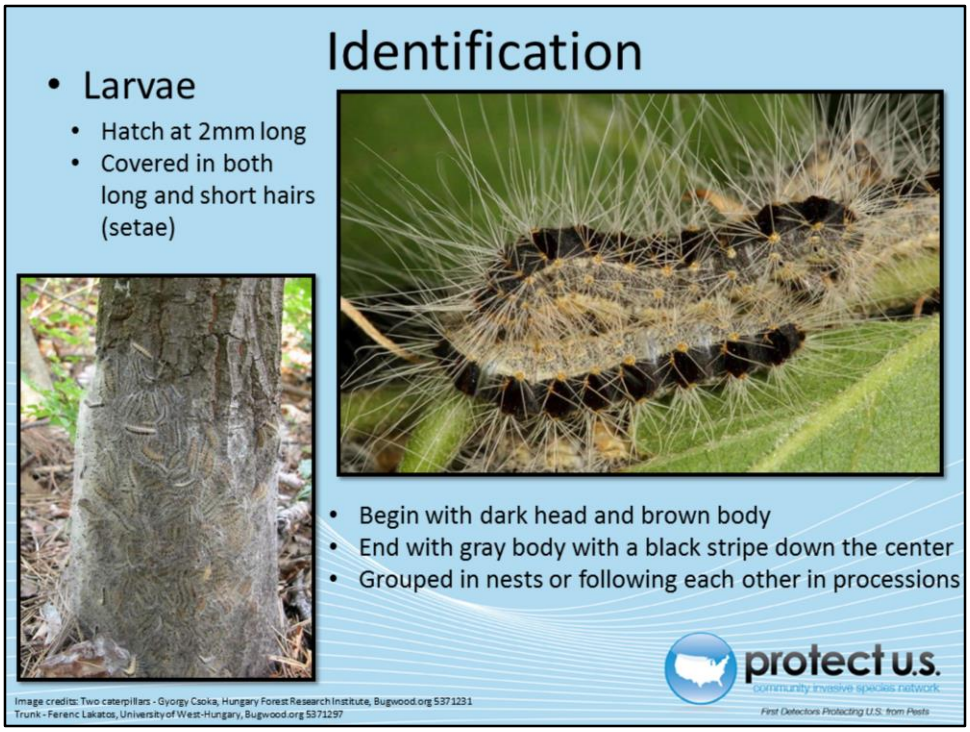
The oak processionary moth caterpillar feeds almost exclusively on oak trees, *Quercus* spp. They will sometimes feed on Hornbeam, hazel, beech, sweet chestnut, and birch trees if they are close to a severely defoliated oak tree (13).



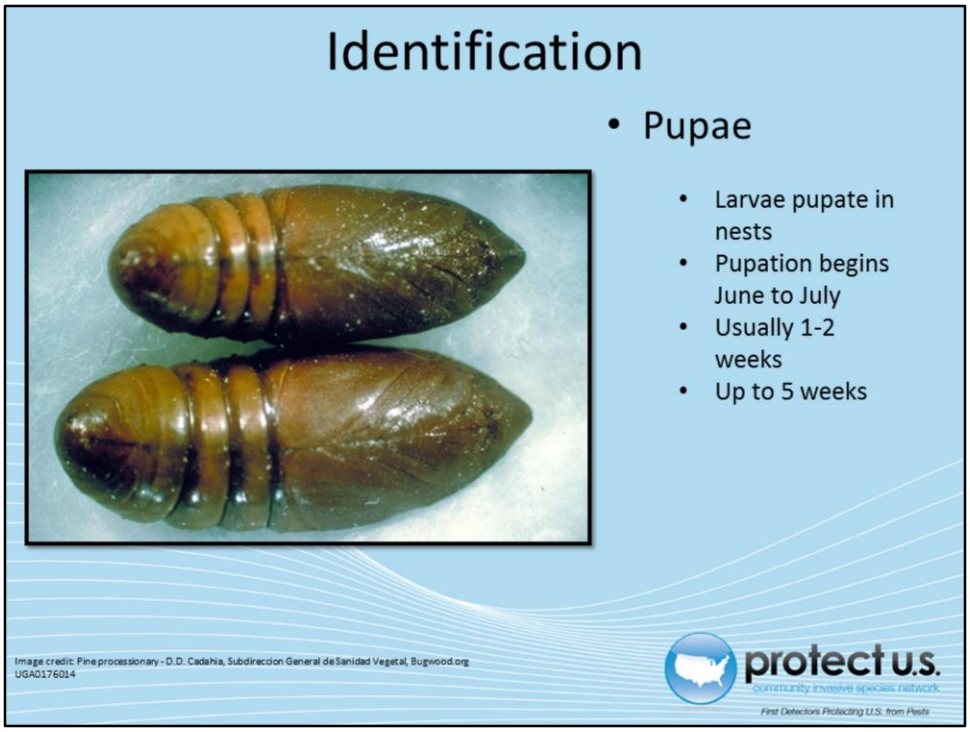
Larvae feed on the leaves and new growth of the trees. They will travel in a procession from tree to tree, and will create large areas of defoliation from feeding. The caterpillars will also spin white silk nests on the branches and trunks of trees. The larvae never spin nests on, among, or using the leaves. Nests can vary in shape from hemispherical, tear-drop, bag like, or even in a blanket (1 and 3).



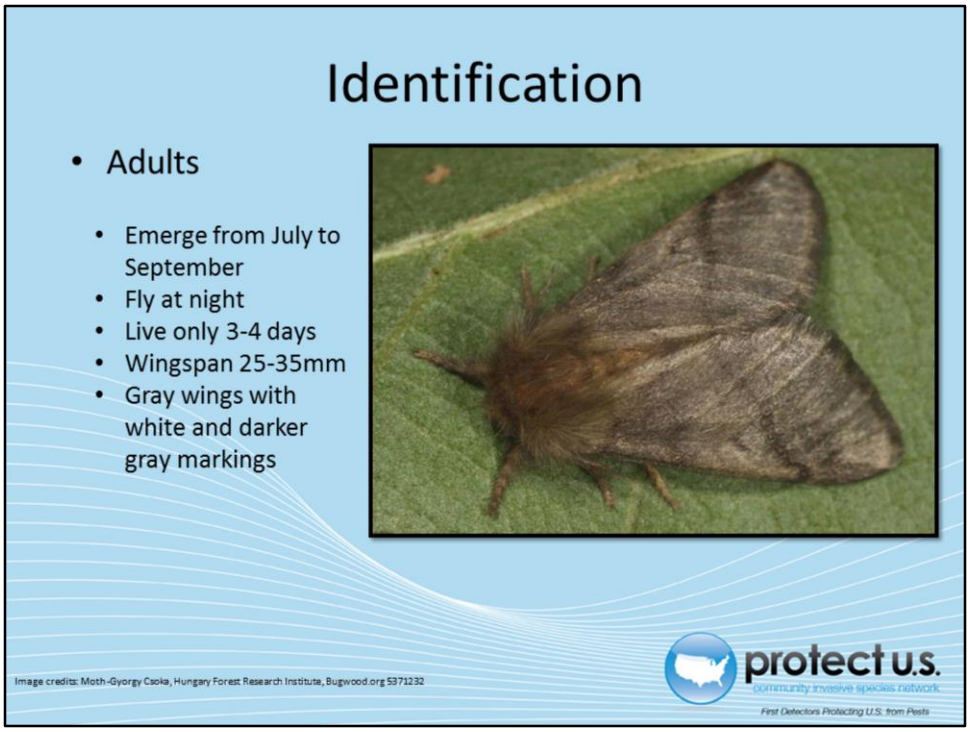
Eggs are laid in masses or plaques on 3 to 5 year old branches or twigs in the canopy (1 and 11). Each mass can contain up to 300 eggs (12). Eggs are lain together in single rows to make the plaque. The female will cover the eggs in grayish scales. The egg masses will overwinter on the tree branches and will not hatch until April (10).



When larvae first hatch they have a dark head and brown body and are only 2mm long. The bodies lighten in color as the caterpillars age (8), until they have a gray body (10). The oldest caterpillars are distinctive since they have a dark stripe with whitish lines on each side running down the center of the back. Larvae also have several thousand short hairs (setae) and clumps of long hairs covering them (10). Caterpillars are present from April until June (8) usually grouped in white silk nests on the trunk or branches (10). When moving, larvae will follow each other in head to tail processions. Caterpillars will pupate inside the nests in June to July (10).



Larvae pupae inside nests from June to July. Pupation lasts 1 to 2 weeks on average (Tree), but can take up to 5 weeks depending on conditions (1 and 12).



Adult moths fly at night from July to September (13). Males will emerge first and are very strong fliers. Both male and females live only 3 to 4 days. Adults generally will remain higher in the tree canopy where eggs are laid. Wingspan ranges from 25 to 35mm. Wings are gray with white and darker gray marking that camouflage with tree bark (1, 10, 11, 12, and 13).

Lookalikes - Adults

Hyphantria cunea: Fall Webworm

V.S.

Thaumetopoea processionea: Oak Processionary Moth

Malacosoma americana: Eastern Tent Caterpillar

image credits: Fall webworm top – Mark Dreiling, Bugwood.org 5461494 Fall webworm bottom - Mark Dreiling, Bugwood.org 5461457 Eastern tent caterpillar - Mark Dreiling, Bugwood.org 5461480 Oak processionary - Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org 5371232

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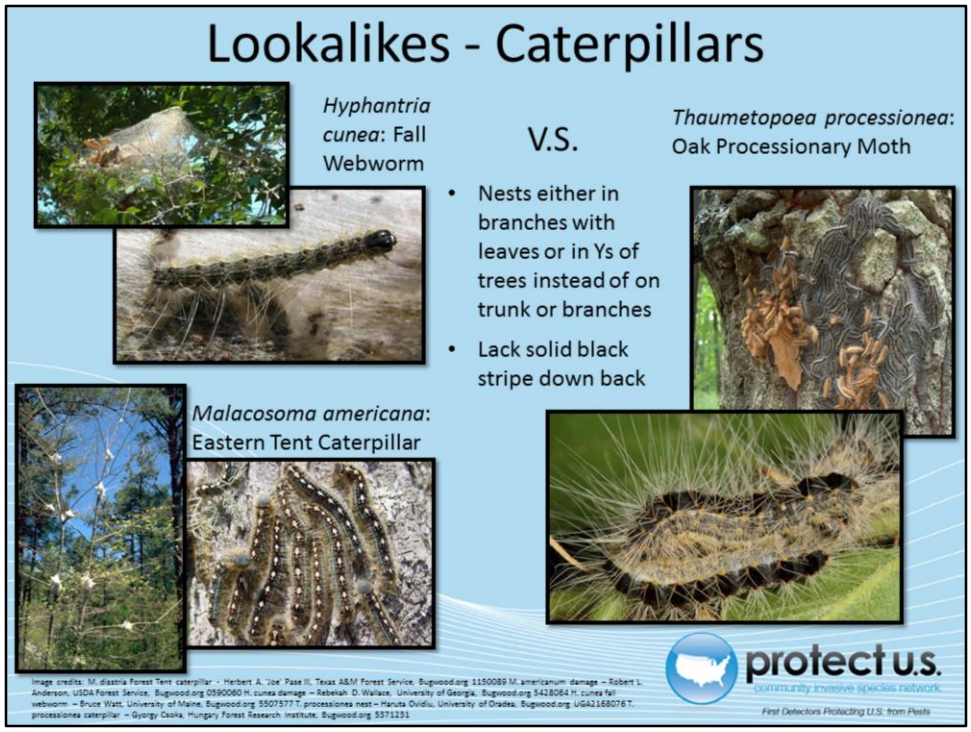
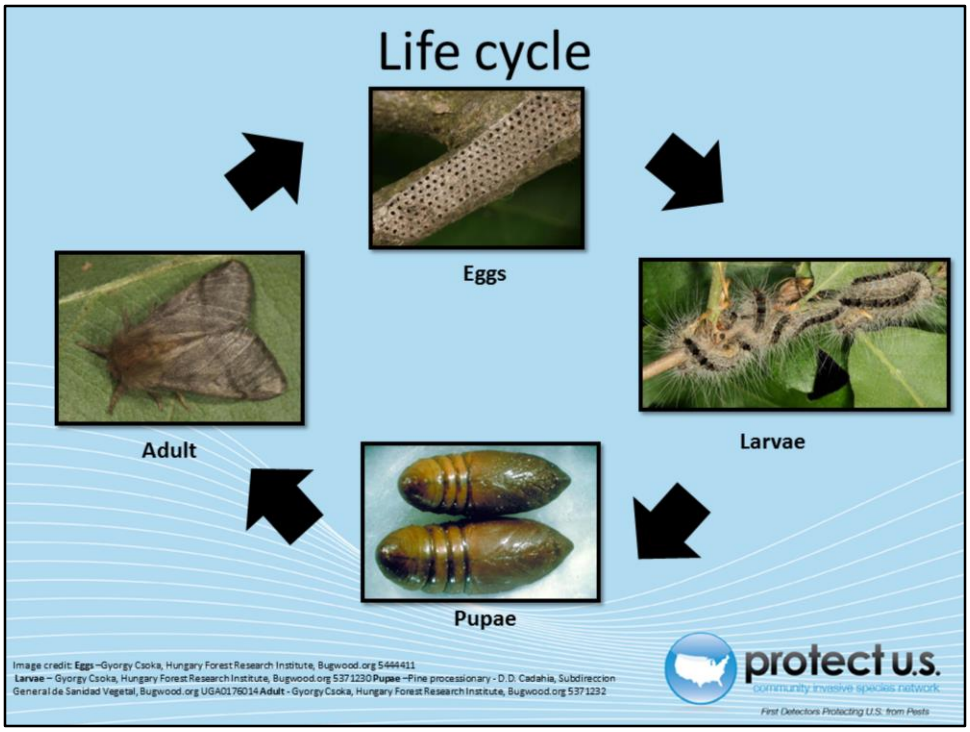
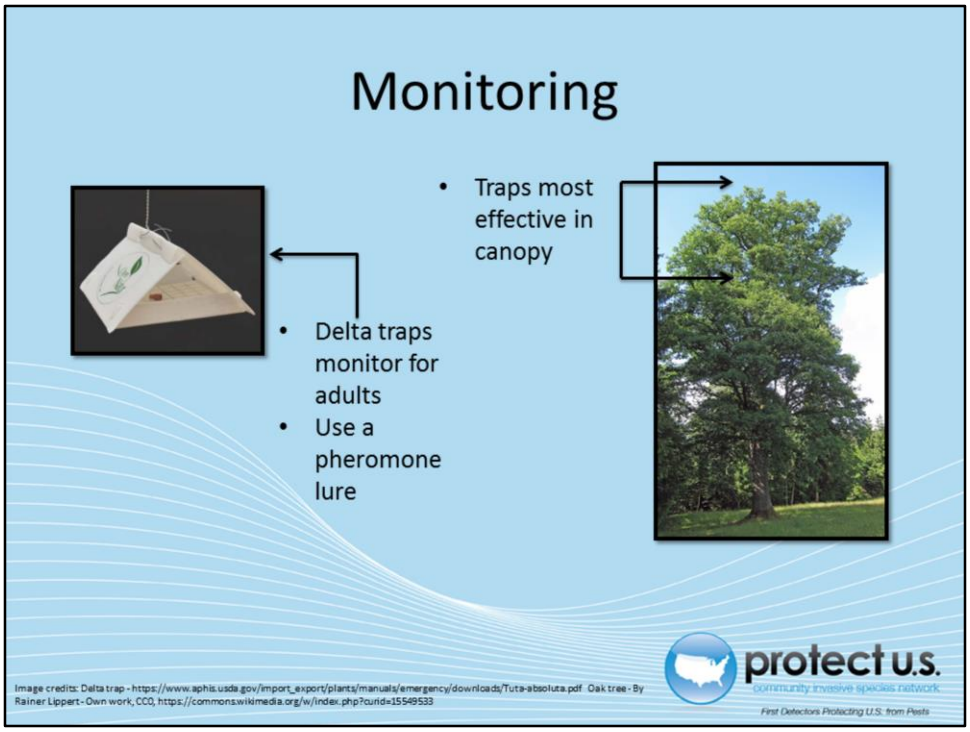


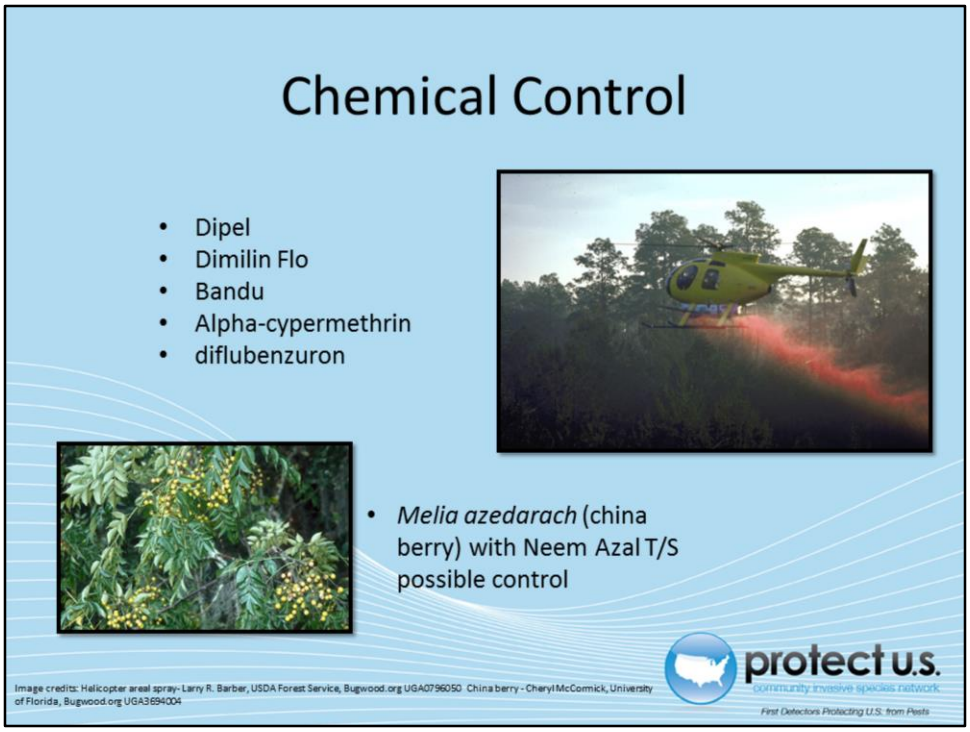
Oak processionary moth caterpillar is similar to both *Hyphantria cunea* (Fall Webworm) and *Malacosoma americana* (Eastern Tent Caterpillar). Both fall webworm and Eastern tent caterpillar are native to the United States and are widely distributed (2, 6 and 9). All of these caterpillars are communal, and build silk nests in trees. Nest location varies by species. Oak processionary moth only builds nests on the truck or branches of trees, never on the ends of branches or using leaves like fall webworm. Eastern tent caterpillar has a similar nest location in the Ys or crotches of trees. However, Eastern tent caterpillar hosts do not include oak, so no tent caterpillar nests will be found on oak trees. Physical appearance of the caterpillars are similar. All three have long white hairs (setae) and are similar sizes. All three also have a darker stripe running down the center of the back; however, only oak processionary has a solid black stripe (1, 2, 6, 10, 11, 12, and 13).



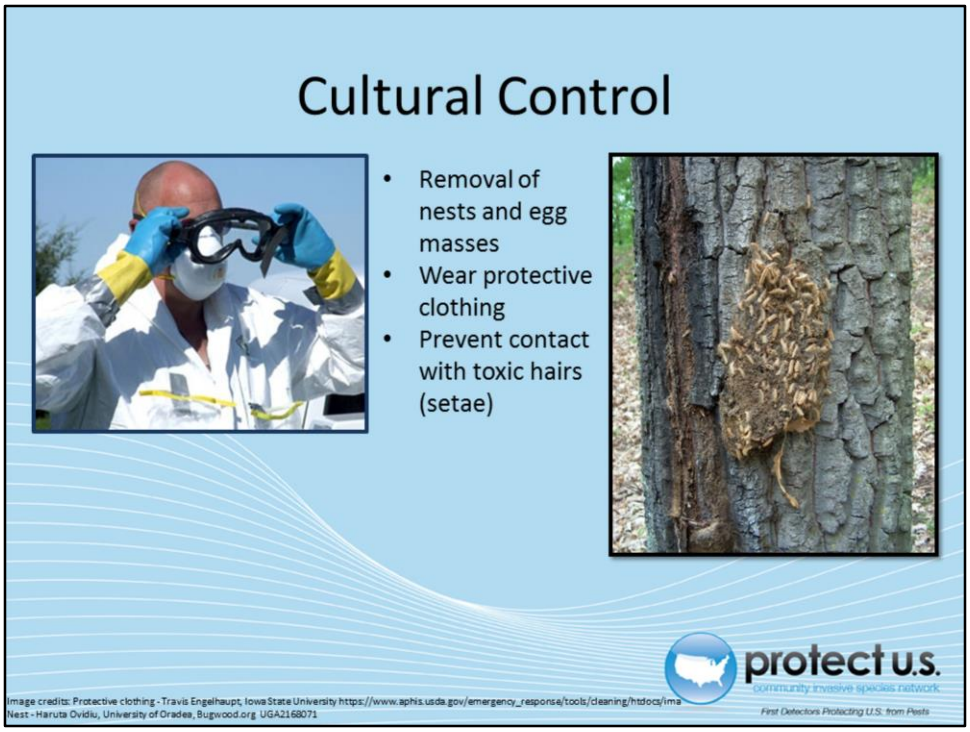
Adult females lay 100 to 300 eggs in plaques on twigs and branches in the tree canopy from July to September. Eggs will overwinter and hatch from April to June. Larvae feed on host trees from the top down and build silk nests (3). Caterpillars will pupate in the nests from about June to August. Adults emerge from July to September, with males emerging first. Adults will live 3 to 4 days flying at night. Mating occurs in the tree canopy where the eggs are laid (1).



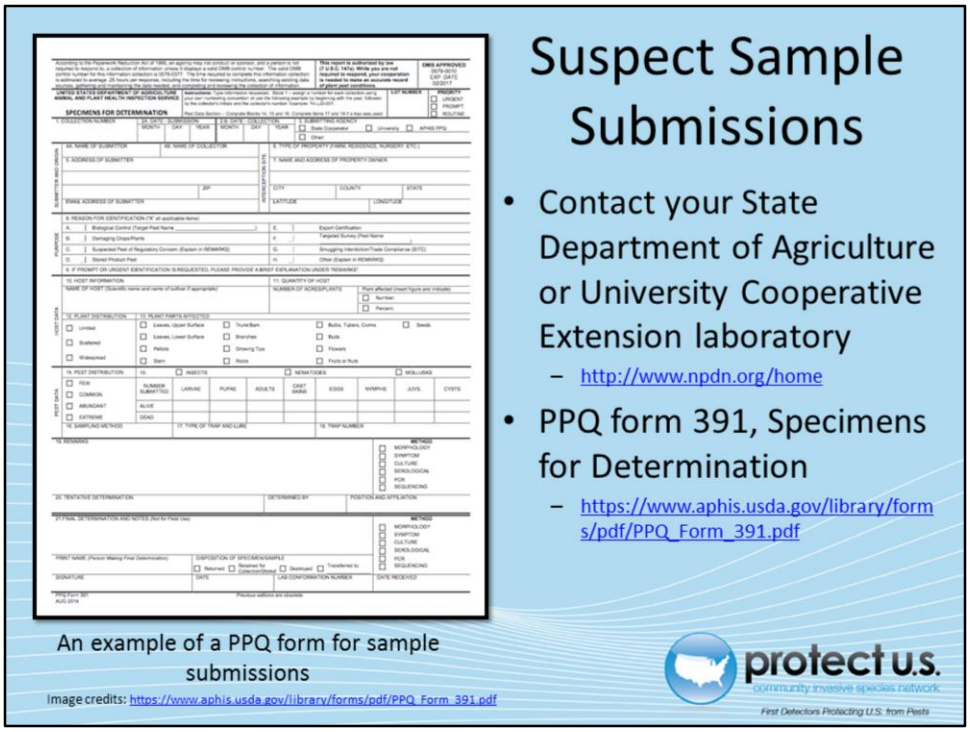
Pheromone traps are an effective monitoring method. Traps should use a combination of (Z,Z)- 11, 13-hexadecadienyl acetate (1), (E,Z)- 11, 13-hexadecadienyl acetate (3), and (Z,Z)- 11, 13-hexadecadienol (2) in a 88:7:5 ratio (1). Delta traps have been found to be the most effective, especially when placed high in the tree canopy (14) It should be noted that all pheromone traps capture males only (1).



Biological control methods are currently being explored in many European countries, but there is no specific biological control for oak processionary moth. There are multiple effective chemical controls. Including Dipel, which contains *Bacillus thuringiensis*, a bacteria (12). A *Melia azedarach* fruit and Neem Azal- T/S combination that is 100 percent effective in a laboratory setting (1). Dimilin Flo is an insect growth regulator that is effective on moths and caterpillars with minimal effect on beneficials (10). Applications of alpha-cypermethrin and diflubenzuron were effective in forests; however, it was detrimental to beneficial insect predators (1). Bandu is another chemical control that is effective on all life cycle stages. It kill caterpillars on contact and is persistent for 6 to 8 weeks (10).



Early identification of eggs and nests is important for control. Both eggs and nests can be physically removed to reduce populations. However, caterpillars have toxic hairs (setae) that detach easily, so removal of nests must be done by professionals with protective gear (10).



If a suspect pest has been located in the United States, a sample should be submitted for proper identification. Contact your local diagnostic lab to ship in a sample for identification. Information regarding your local diagnostic lab is available at National Plant Diagnostic Network (NPDN) website. The diagnostic lab information and available contacts are divided by state.

http://www.npdn.org/home

The sample specimen should be submitted along with accompanying documentation using the PPQ form 391.

https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf

Your local diagnostic lab is part of your local cooperative extension service or your state department of agriculture. Your local lab will also have a specific form. All local labs may not be a member of NPDN. However, all labs should report new pest and pathogen detections to local regulatory officials.

Remember that new pest and pathogen records must be reported to your State Plant Health Director (SPHD) and your State Plant Regulatory Official (SPRO). The SPRO is a State Department of Agriculture Employee and the SPHD is a USDA-APHIS-PPQ employee.

The link to your SPRO is on the National Plant Board (NPB) website. It has an interactive map and when you click on your state it will take you to another page with contact information. The NPB is a cooperative organization that includes membership from all State Departments of Agriculture.

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