

MANAGEMENT OF KEY INSECT PESTS OF TREES AND SHRUBS

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Gypsy Moth Management for Homeowners (*Lymantria dispar*)

What kind of trees do you have? Unless you have the kind of trees that gypsy moth caterpillars like to eat, you do not need to worry. Gypsy moth caterpillars prefer to feed on oak, aspen (poplar), birch, crabapple, mountain ash, red-leaf cultivars of Norway maple, and willow trees. Other trees are not likely to be defoliated.

Can you find gypsy moth egg masses? In woodlots at the highest risk of defoliation you should be able to find at least a few egg masses in five minutes of searching. Look on the underside of tree branches and on tree trunks for gold, brown or tan colored egg masses 1 to 1 1/2 inches long, and oval-shaped. The egg masses are flattened against the bark, and are covered with fine hairs. If you cannot find any egg masses it is unlikely that your trees will be defoliated. If you can find more than one egg mass per tree some defoliation is likely.

What can you do this spring when gypsy moth caterpillars hatch and start feeding? Caterpillars start hatching in mid-May and peak feeding injury is in late June. The safest way to control gypsy moth on small trees is to spray infested trees with *Bacillus thuringiensis*, B.t. (Dipel or Foray) when the caterpillars are small. However, B.t. is not effective for control of gypsy moth when the caterpillars are greater than 1/2"-long. Another safe product is neem oil, sold as Margosan or Bioneem. Neem products do not provide residual activity. Some people may wish to band the trunks of their trees with burlap or slippery tape to prevent caterpillars from climbing up the trees. This strategy helps reduce the number of caterpillars present, but will not prevent defoliation during an outbreak. Small trees can also be sprayed with Sevin (carbaryl), Malathion (malathion) or Orthene (acephate). Follow the label directions carefully and avoid contact with the insecticide solution. Some trees may be too large to spray with homeowner equipment. A difficult decision must then be made. A professional landscaper or arborist can be contacted to apply a systemic insecticide, or to spray the trees with B.t. or Dimilin (selective insecticides) or with Malathion, Sevin or Orthene. Homeowners may also purchase Acecap (Orthene) injection capsules. However, the holes that must be drilled to insert the capsules may be damaging to trees. Homeowners may choose not to use any insecticide and simply weather the storm. A total leaf loss of less than 30% is not harmful to trees. Defoliated trees should be given adequate water and fertilizer to help them recover. In Midland county, red oaks in woodlots have suffered 26% mortality after one or two years of heavy defoliation. The weakest trees are most susceptible. Individual trees in a yard should be more resilient but some limb dieback is expected after one year of 100% defoliation.

For more information on gypsy moth or on fertilizing trees and shrubs see extension bulletin E-1983, the gypsy moth in Michigan: A guide for homeowners and small woodlot owners; and E-1947, Planting and care of ornamental landscape plants.

Eastern Tent Caterpillar (*Malacosoma americana*)

Identification: Watch for small tents developing in the crotches of trees when wild cherry leaves expand in spring. Tent caterpillar larvae have a white stripe running along the top of their bodies. Lateral areas of each segment have blue spots and support long, fine lateral hairs.

Host Plants: Favorite host plants are wild cherry, apple, and crabapple. Tent caterpillars may also occasionally be found on ash, birch, blackgum, willow, witch hazel, maple, mountain ash, oak, poplar, cherry, peach, and plum.

Life Cycle: This insect overwinters as eggs in a silvery bullet-shaped egg mass glued to the stems of host plants. Larvae hatch from eggs shortly after bud break in early spring and soon form small tents. The silken tents grow larger as the larvae do. The caterpillars hide inside these tents during the day and venture out to feed on leaves at night. Mature larvae, nearly two inches in length, leave the tents and wander a long distance in search of a protected site for pupation. Reddish-brown moths emerge from pupae in late June or early July. They mate and lay egg masses that remain dormant until the following spring.

When to Scout: Look for tents in the crotches of susceptible trees in May.

Management: Spot treat trees with tents by spraying the foliage around tents with Margosan, Dipel, Foray, Orthene or Sevin.

Birch Leafminer (*Fenusa pusilla*)

Identification: The birch leafminer is in the order Hymenoptera, along with bees and wasps. The adults are black, compact flies, about 3 mm long. The larvae are small, white and flattened. They feed inside of leaves in mines.

Host Plants: Preferred: *Betula populifolia* (gray birch), *Betula papyrifera* (paper birch), *Betula alba* (white birch), and *Betula pendula* (European white birch). Less preferred: *Betula lenta* (black birch), *Betula alleghaniensis* (yellow birch), and *Betula nigra* (river birch).

Life Cycle: Adults oviposit inside leaves when they are about 1/2 expanded. Oviposition scars and early feeding can be observed by holding leaves up to the sun. The larvae complete development in 10 to 20 days. Mature larvae cut a hole in the leaf and fall to the ground to pupate in the soil. After 3 weeks in the soil, some adults emerge from pupa but most diapause until the following spring. Adults look for new growth to deposit their eggs. Trees may be weakened after 2-3 years of heavy leaf mining. Weakened trees may attract borers.

Management: Maintain good watering and fertilization practices. Plant resistant species when possible. Damage can be prevented by a single well-timed insecticide application. Apply insecticide when leaves are about 1/2 expanded or when the first tiny mines appear. A second application, two weeks later, may be necessary in some years. Orthene, Dursban, and Sevin can be used as foliar sprays. Insecticides are not usually needed for the second generation of leafminers.

Honeysuckle Aphid (*Hyadaphis tataricae*)

Identification: Examine plantings of large bush forms of honeysuckle for plants with curled leaves with deposits of black, sticky honeydew. When curled leaves are opened, small, pale green to cream-colored aphids are found inside. Heavy infestations cause stunting and witch's-broom damage to the plants.

Host Plants: All Zabelii and Tatarian honeysuckle bushes seem to be susceptible to this aphid. Some resistant cultivars have been identified and suggested as substitutes for susceptible plants. They include: *Lonicera x notha*, *Lonicera x muendeniense*, *Lonicera x amoena*, *Lonicera x xylosteoides*, *Lonicera tatarica* 'Arnold red', 'Alba', and *Lonicera 550111* (L. Korolkowii).

Life Cycle: Honeysuckle aphids overwinter as eggs that hatch in spring at bud break. Honeysuckle aphids reproduce asexually all spring and summer, feeding on new shoots and inside folded leaves. In September winged males and wingless females mate and eggs are deposited on twigs.

Management: The following quote from Dirr sums it up: "The honeysuckle aphid has essentially rendered the plant a liability in the midwest and east. With wonderful viburnums to fill almost every nook and cranny of a garden this plant (*Lonicera tatarica*) is headed for the recycling factory."

The resistant cultivars listed above or other plants should be used as replacements for susceptible plants. Infested plants can be treated every 3 to 4 weeks in June and July with Orthene. Malathion is not very effective. Best results are obtained by following shearing with an insecticide.

Because intensive management practices are needed, susceptible honeysuckle shrubs should not be planted, and it may be best to replace existing plantings.

Pine Needle Scale (*Chionaspis pinifoliae*)

Identification: Adult female scales are easily recognized as small (3 mm) white, "oyster-shaped" or oblong flecks on pine needles. Heavy infestations may make branches appear snow-covered.

Host Plants: Pine needle scale, also known as "white scale" attacks Scotch, Mugho, Austrian, and nearly all other species of pine grown in Michigan. Douglas fir and spruce species may occasionally be infested.

Life Cycle: Females lay reddish-brown eggs underneath the white scale covering in mid-August. Eggs overwinter under the waxy white exoskeleton of the dead adult female. Eggs hatch the following spring, usually in May when lilac is in full bloom. The reddish colored crawlers are the immature stage of the scale and are mobile. Crawlers move about the tree to find a suitable site for feeding. Crawlers may be blown to surrounding trees or other fields by spring winds. Nymphs settle on a suitable needle, insert their straw-like mouthparts into the needle, and begin feeding on plant sap. Nymphs feed and grow for several weeks, then mature into adults in early July. Scales mate and a second generation is produced about mid-July. This generation of scales feeds until mid- to late August, when eggs are laid and females die.

Scouting: Monitoring is critical for management of pine needle scale. Infestations often begin on the lower branches of trees. Turn over shoots to see if scales are present on the undersides of needles. Watch for crawler emergence in May and again in July.

Management: Several species of ladybird beetles (ladybugs) are effective predators of pine needle scale. Pine needle scales may also be killed by tiny parasitic wasps, cold winter weather, and disease. Natural enemies may provide adequate control of pine needle scale populations, especially if trees are several years away from harvest.

If scouting indicates that control is needed, an insecticide can be used. To be effective, insecticides must be applied when crawlers are present. In Michigan, use full bloom of lilac bushes to help time insecticide application. Insecticidal soap or oil are effective as crawler sprays. Insecticide treatment during the second generation is needed only in severe infestations, when trees are within 1-2 years of harvest. Dormant oils can be used in fall or early spring to kill scales without harming beneficial insects. Do not use dormant oils on spruce trees that are within 1-2 years of harvest, as the oil may cause discoloration.

Euonymus Scale (*Unaspis euonymi*)

Identification: Check leaves and twigs for elongate white male scales (1.0 mm) and brown scallop-shaped female scales (1.5 mm) on leaves and stems. Damage may appear as yellow spots on leaves.

Host Plants: *Euonymus fortunei* is the most susceptible, but Euonymus scale may also be found on other species of Euonymus, Pachysandra, Celastress, Camellia, twinberry, eugenia, holly, Buxus, Daphne, Lonicera, and Ligustrum.

Life Cycle: Euonymus overwinter as fully-grown brown females. Eggs develop in early spring under the female scale. Eggs hatch and crawlers emerge over a 3-week period starting in early June. Crawlers disperse by crawling or blowing in the wind. Mature male and female scales develop by July. In late July and early August a second generation of crawlers emerge. These mature by fall to complete the second generation.

Management: Prune out heavily infested branches in late winter or early spring. If scales are easily found, they should be treated with horticultural oil as a crawler spray in June. Treat foliage and stems when crawlers first start to emerge, usually in early June, and again two weeks later. For the second generation of crawlers treat in late July and again two weeks later. Don't apply oil sprays unless live scales are found. To check for live scales run a thumbnail along an infested twig and look for yellow liquid from the body of squashed scales. If no yellow color is observed, the scales are dead.