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## Controlling Insect Pests of Shade and Ornamental Trees

### CONTROL MEASURES

For defoliating, leaf chewing insects, use methoxychlor or carbaryl (Sevin) at the following rates:

Formulation		Amount per 100 gallons	Amount per gallon
methoxychlor	50% WP*	2 lb.	2 tbsp.
	25% EC+	2 qt.	4 tsp.
carbaryl	80% WP	1 1/4 lb.	4 tsp.
	50% WP	2 lb.	2 tbsp.

\* WP = wettable powder  
+ EC = emulsifiable concentrate

These dosages are for hydraulic or compressed air sprayers with application to foliage to the point of runoff. Mist blowers use more concentrated spray mixtures at a lower volume of application.

The leaf-feeding caterpillars, saw fly larvae, and beetles appear at different times during the year. Listed are some of the common Minnesota species and how to control them.

Pest	Host Plants	Time to Control
Cankerworms	Elm, oak, maple, boxelder, others	At first signs of injury and before 50% of the foliage is consumed – usually May
Eastern tent caterpillar	Cherries, mountain ash, others	Early to mid-May when webbing and "tents" appear
White marked tussock moth larvae	Elm, linden, poplars, maples, boxelder	Mid to late May; occasionally again in August
Fall webworm	Most deciduous trees	July and August
Spiny elm caterpillar	Elms	Late May, June
Brown headed ash sawfly	Ash	Late May, early June
Red headed pine sawfly	Jack pine	Late June, July
Jack pine sawfly	Jack pine	Late May, June
Introduced pine sawfly	White Pine	June, again in August
Spruce budworm	Fir, spruce	As buds break and again 10 days later
Leaf beetles	Willow, poplar, cottonwood, aspen, others.	When adult beetles appear; repeat when larvae appear

The spruce needle miner may be controlled by using methoxychlor or carbaryl from mid-June to mid-July.

The birch and elm leaf miners may be controlled by applying diazinon AG 500 at 1 quart per 100 gallons of water or 2 teaspoons

### TYPES OF DAMAGE

#### Leaf Chewers

A number of insects, mostly caterpillars and beetles, damage foliage by consuming all or parts of leaves or needles. This may take the form of skeletonizing, leaf mining, or free feeding. The skeletonizers consume the soft leaf tissues leaving a lacy pattern of the veins and sometimes the upper or lower leaf surface. The miners work between the leaf surfaces causing brownish or papery blotches or winding narrow trails. The free feeders eat the complete leaf and sometimes fold or roll the leaves or web leaves together.

Broad-leaved trees in otherwise good condition can withstand a complete defoliation without serious injury. They will produce a second crop of leaves the same season if defoliation occurs before August. Extensive defoliation for several successive seasons can kill the branches (called die-back) and possibly the tree.

Most evergreens, however, will die if completely defoliated. Any branch that is stripped of all its needles should be pruned out.

#### Sap-Sucking Insects and Mites

Aphids, plant bugs, scales, thrips, and mites extract the sap from buds, leaves, twigs, or stems. Their attacks frequently cause curling, spots, galls, yellowing, mottling, or deformed leaves and flowers. A healthy, well established tree will withstand most infestations without permanent damage. However, some die-back may follow heavy infestations and ornamentals are frequently disfigured. This detracts from their value in the landscape.

Some aphids and scale insects also secrete a sweet sticky material called honeydew. During periods of heavy infestations, honeydew coats the leaves and branches of the trees as well as sidewalks, lawn furniture, and other objects under the trees. A black sooty-mold fungus grows on this honeydew, giving the trees a sooty appearance.

#### Disease Transmission

Some insects are vectors of disease organisms. The most common of these is Dutch elm disease, which is spread by elm bark beetles. Chemicals are sometimes needed to control these insects, which carry diseases but which may not otherwise be harmful to trees.

#### Borers

Trees and shrubs may be attacked by several kinds of insects which bore or tunnel inside trunks, branches, or twigs. Borers generally infest weakened or dying trees rather than healthy, vigorous ones. Proper pruning, fertilizing, and watering will help prevent borer problems. There are few practical chemical controls for borers. Some species may be controlled in individual specimen trees by injecting the burrows or tunnels with carbon tetrachloride and then plugging the treated burrows with clay or putty.

per gallon or with malathion 57 percent EC at 2 pints per 100 gallons or 2 teaspoons per gallon.

**Elm Bark Beetles**

Use 8 gallons of 25 percent methoxychlor EC per 100 gallons (hydraulic sprayers) or 50 gallons per 100 gallons (mist blowers) of total spray mix. Apply during the spring dormant period. Cover all bark surfaces thoroughly.

**Sap-Sucking Insects and Mites**

Some aphids and mites may be controlled by spraying with a dormant oil before the leaves appear in the spring. Elm leaf aphid, elm and apple woolly aphids, elm cockscomb gall aphid, and woolly elm bark aphid are those controlled by dormant oil sprays as applied for scale insect control. Other aphids may be controlled with malathion at 2 pints of 57 percent EC per 100 gallons (2 teaspoons per gallon) or with diazinon at 1 quart of AG 500 per 100 gallons (2 teaspoons per gallon). Apply when aphids are present. Large, well established trees are not seriously damaged by aphids and seldom require control measures.

Spider mites ("Red Spider") can be very destructive to ornamentals and evergreens and should be controlled with one of the following sprays:

- chlorobenzilate or chloropropylate (Acaralate)      1 quart 25 percent EC per 100 gallons (2 teaspoons per gallon)
- dicofol (Kelthane)      1 pound 35 percent WP per 100 gallons (1 tablespoon per gallon)
- ovex      1 1/2 pounds 50 percent WP per 100 gallons (1 1/2 tablespoons per gallon)
- tetradifon (Tedion)      1 1/2 pounds 25 percent WP per 100 gallons (1 1/2 tablespoons per gallon)

Diazinon or malathion at the rates given for aphid control also will help control mites.

**Scale Insects**

Dormant sprays  
 Oystershell ]  
 European elm ]  
 Scurfy      ]  
 Cottony maple ]  
 Brown elm    ]  
 (Lecanium) ]

Use "Superior" type dormant oil or a dormant oil plus diazinon or ethion at 2 to 3 gallons per 100 gallons of total spray mix. Apply in the fall after all growth has stopped or in the early spring before buds open, but when temperature will remain above freezing for at least 24 hours after spraying.

For spring or summer sprays at time of insect hatch use 2 pints 57 percent malathion EC or 2 pounds 50 percent carbaryl (Sevin) WP per 100 gallons.

Scale	Host	Time to Spray
European fruit <u>Lecanium</u> , (brown elm scale)	Elm, fruit trees	Early July (about the time Catalpas bloom)
Oystershell	Many shade and fruit trees and shrubs	Early June, when apple petals have fallen
Cottony maple	Maples, linden, box-elders, black locust, elm	Late June, July
Scurfy	Elm, maples, hack-berry, willow	June and July
Pine needle	Pines, spruce	Late May when lilacs are in bloom
Pine tortoise	Pines, mainly Jack and Scotch	Late June, early July
Fletcher	Arborvitae, yew	Early to mid-July
Spruce bud	Spruce	Mid-June to mid-July

**Systemic Insecticides**

Several systemic insecticides are available for the control of some of the scale insects, leaf miners, and aphids on specific hosts. Some may be applied as foliar sprays and others are used as soil treatments. Most of these products are for use by commercial growers or professional applicators only. For more information contact your pesticide supplier or the Department of Entomology, Fisheries and Wildlife, University of Minnesota.

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