

Landscape

by Dr. R.E. Partyka

Insect damage to woody ornamental can vary from the subtle insignificant to widespread destruction that eventually results in death of plants. There are many plants included in the ornamental area with a varied assortment of insects on each species. This results in a relatively large number of insect pests that can be destructive to ornamentals. Fortunately, all of these insect pests do not appear at one time or in one year, as many of them are cyclic.

Insect control is dependent on early recognition of the specific insect, its significance in the area, its life cycle or biology, a practical approach to control if needed and materials to use on the pest and their effect on the environment.

Early recognition is important in preventing serious damage to the plant. The majority of the space devoted to this article will dwell on recognition. Once we have established the insect is on a plant, we need to evaluate its potential for severity and what measures will be employed to minimize plant damage.

A second step is to consider its significance. Is it important at this

time and what will happen in the future if nothing is done? How does the client view the pest problem? Are holes or webbing so obnoxious that a high degree of control is needed? Also what time of the year does the pest develop?

A late season defoliator may be annoying, but does little harm to a plant that is essentially shutting down for the season. But if this annoys a person who owns the plant, then appropriate suppressive measures must be applied at the proper time.

An early season defoliator may result in foliar devastation but new leaves will form and mid- to late-season appearance will approach that of normal plants.

Continued defoliation each year may be harmful to the plant and results in a second onslaught of problems at some late date. The person diagnosing the problem must understand the consequences of minimal control and the client's feelings toward the problems must be put in perspective.

Life cycles

Life cycles and general biology of the insects are important in

determining sensible control strategies. Often times, early control materials can be used in reducing the pest and are safer to the applicator and environment. Treatment at the appropriate stage of development can result in good suppression with a safer material of relatively low toxicity. In some cases, reasonable control can only be obtained at a certain stage in the life cycle of the insect and this becomes critical if one is to obtain satisfactory results.

A practical approach to control needs to be resolved with certain pest problems. The nature of a life cycle and certain predisposing factors that may influence the pest outbreaks need to be considered and evaluated. In some situations, there are no practical means to control because of the advanced nature of the problem at the time. Therefore, removal and starting over again may be the best approach. Again a full understanding between diagnostician and client is important.

Materials to use on a specific pest need to be determined based on research results, climatic conditions, size and age of the pest, plant reactions, equipment capabilities, area where the material is to be used and effects on other forms of life. It should be understood that 100 percent control of a pest is not practical or possible. Shifting a delicate balance where and when it is needed is the prime aim of pest control. Therefore, many other factors need to be considered in maintaining strong healthy plants that are capable of withstanding a degree of insect injury but can recover in a short period of time with minimum visual symptoms and little impact on total plant vigor.

What to look for, where, and suppressive measures to use should be checked in your area by contacting the local county extension agent, farm advisor, or the State University. Climate variations and num-

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Fall webworm larvae produce silk to form a web where they feed. One to four generations can take place in the U.S. per year.

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ber of generations of a pest are important when providing the service to a client for optimum results and satisfaction.

Pests and control by season

DORMANT PERIOD: This appears to be an ideal time to control insects that survive from season to season in the egg stage or an immature form that can be smothered by the use of a highly refined oil, generally referred to as superior oil and often times called dormant oil. Its mechanism of action is to exclude oxygen to the insect and not damage the plant. However, oils will not control eggs laid in large masses that are engulfed in a protective layer of hair, wax, or other materials or have limited breathing pores.

I. Scales

A. *Armored Scales* — oil controlled or else wait for the crawler stage.

1. Oyster shell — Found on a wide assortment of plants. Characteristic to look like oysters on a branch. Brown and gray scale. Brown has two generations a year which often involves additional sprays in the foliage stage.

2. Cottony Maple Scale — Small immature females on younger wood. Most common on Silver Maple and Linden — One Generation.

3. Obscure Scale on Oak — Often overlooked because it blends in well with the natural bark. Ideally named. One Generation.

4. Pine Needle Scale — Obvious white flecks on needles. More than one generation in many areas makes this scale difficult to control.

5. Euonymus Scale — Obvious white flecks on leaves and not as obvious on the woody tissue. Multiple layers makes control difficult. Multiple generations — female scale resembles oyster shell scale when initially developing.

6. Euonymus Scale (Winged) — A scale on *Euonymus elatus* types

that blends in so well with the natural bark that it is often missed and not recognized until segments of the plant dies.

7. White Peach Scale — A very characteristic growth on stone fruit, lilac and privet. Females are circular, white tinged with lemon yellow center, males are elongated and white. Multiple generations in the south.

8. San Jose Scale — At one time a severe pest problem on many plants. It appears to be on the increase in some areas. Multiple generations exists.

9. European Elm Scale — Primarily on elms. Females are oval, reddish brown and surrounded by a white cottony fringe — One Generation.

10. Camellia scale — Females are elongate, oval and dark brown to almost black in color. They somewhat resemble oyster shell scale. Overlapping generations exist.

11. Juniper scale — White round convex females with yellow center on juniper but arborvitae, incense cedar and cypress attacked — One Generation.

B. *Unarmored or Lecanium scales* — oil control is minimal unless applied at critical stage in life cycle. In general major direction of control is toward the crawler stage of the life cycle, with materials such as acephate, bendiocarb, diazinon, malathion and dimethoate.

1. Fletcher Scale — Common on taxus. Sometimes called Taxus Lecanium. Also on arborvitae and juniper — One Generation. Crawlers occur in July, feed on foliage then on bark.

2. European Lecanium — Found on Ash, Oaks, Pine and fruit trees. Crawlers active in June — feed on leaves. One or two generations.

3. Magnolia Scale — One of the largest scales. Crawlers active in late summer or early fall. One Generation. Sooty mold common due to heavy honey dew formation.

4. Globous scale — A scale of mi-

nor importance but injurious to prunus species.

5. Tulip Tree scale — Large scale that feeds on the bark. Crawlers active in late summer. One Generation.

6. Wax Scale on Euonymus — Scales with thick heavy covering of white wax over their bodies. Common in warm climates on many plants. May have more than one generation. Highly reproductive. Control in crawler stage best.

II. Eggs in Singles or Single Layers

— can be suppressed with superior oils.

1. Fall Canker Worm — Eggs deposited late in the fall and controlled by superior oil. One Generation.

2. Eriophyid Mites (Ash flower gall, Bladder gall mite maple) — Mites or eggs that are found under or around buds where they overwinter. Can be suppressed with superior oils. Pear leaf blister mite, ash flower gall, arborvitae tip dwarf mite, maple bladder gall mite fall in this group. In most cases — One Generation.

3. Aphids — Soft bodied insects that over winter as eggs on specific hosts in northern climate. Oils will help suppress development on treated plants. Rapid build up on other plants often necessitates the need for additional treatments during the growing season.

4. Spider Mites — Species such as spruce spider mite or red mite on apple that overwinter as eggs on the needles or woody tissue can be controlled with oils. This is different from the two spotted mites that over winter as hibernating females in plant duff. Multiple Generations.

III. Eggs in Masses — cannot be suppressed with superior oils. Control directed to larval stage of life cycle.

1. Spring Canker Worm — Eggs deposited on masses on bark early in the spring.

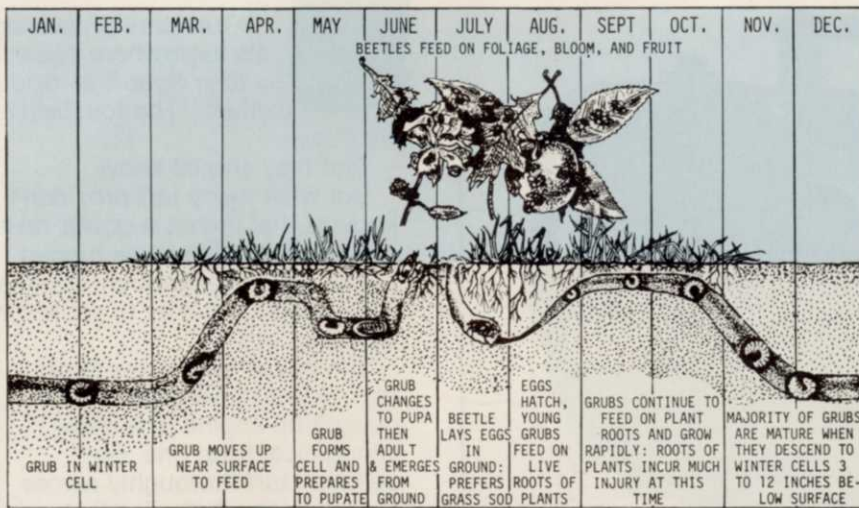
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2. Gypsy Moth — Masses of eggs in a felt-like media of insect hairs. One Generation.
3. Eastern Tent Caterpillar — Masses of immature embedded in a varnish like material that is resistant to oil penetration. One Generation.
4. Tussock Moth — Masses of eggs cemented to the old cocoon.

Oak Leaf Gall, Oak Flower Gall) — Many are difficult to control because of unknown or complicated life cycles. The ones that form on new growth and related bud tissue can be suppressed to a degree with superior oil when it is used prior to bud break each season. One needs to justify the expense and degree of control obtainable.

correlate well with plant development and degree day heat-unit accumulation. These spring feeders, when present in large numbers, can cause severe defoliation in a matter of days. The young stages are often unnoticed because of minimal feeding but as they mature the last few days of their life cycle often results in rapid defoliation. At this stage it is almost impossible to obtain control as the insects requires a large volume of pesticide for its mass, often beyond registered dosages, or one cannot treat plants fast enough to obtain control.



Life cycle of the Japanese beetle tells the landscape manager spring soil treatments may reduce summer foliage damage.

IV. Woody Galls — life cycles and timing very important for control.

1. Cooley Gall (Adelgids) — Galls are empty at this stage but the immature are present at base of needles where oils can give a degree of control. But you need to watch for needle color shift with oil. Better to use Sevin, Malathion or Dursban on prime plants, just prior to bud break.
2. Eastern Gall (Adelgids) — Old brown galls are empty at this stage but immature are present at base of needles where oils can give control. Coverage and penetration important. Note Cooley gall controls.
3. Horned Oak Gall — Common on pin oak and other black oaks. Complicated life cycle. Horned oak gall has a two year cycle and oils will give a degree of suppression if used on a regular basis.
4. Miscellaneous Galls (Succulent

V. Bark Dwellers —

1. Pine Bark Aphids — Insects that overwinter on the bark of woody stems. Pine bark aphid is often on white pine but woolly aphids of apple and pear often overwinter in similar manner. High pressure sprays with superior oil will help reduce population but additional insecticides are needed later for best results.
2. Mealy Bugs (Taxus mealy bug) — Oval sluggish insects with short spines on body margins and a covering of a mealy white powder often buried in a mass of cottony fiber at egg laying time. Oil emulsions will aid in control.

SPRING INSECTS: Tender succulent foliage provides an ideal food source for certain insects that hatch with some of first warm weather of spring. This appears to

I. Foliage Feeder

1. Eastern Tent Caterpillar — Early development when bud breaks on wild cherry, apples, and crab-apples. (Note Webbing) Acephate, Bt, Sevin, Malathion, Methoxychlor, Dylox, Dymet for control — One Generation.
2. Spring Canker Worm — Eggs deposited in the spring — Two prolegs — Control Bt, Sevin, Methoxychlor, Acephate, Dymet — One Generation.
3. Fall Canker Worm — Eggs deposited in late fall. Three prolegs. Control same as for Spring Canker Worms or oil. — One Generation.
4. Forest Tent Caterpillar — Similar to Eastern Tent Caterpillar but form silken mat on trunk and branches instead of webs. Note markings on back. One Generation.
5. Gypsy Moth — Voracious feeders on many plants preferring oak but damaging to many other species. Heavy population in NE USA with scattered population outbreaks in other states. When present, proper timing of Sevin, Acephate, BT, Methoxychlor, will give control. Populations vary depending on natural controls — One Generation.
6. Tussock Moth — General feeders of trees and shrubs. White marked common, white tufts of hair. Western Tussock moth a

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Canker worm larvae can defoliate entire trees and then swing to nearby trees on strands of silk.

problem in Mt. States. White marked may have several generations. Most materials listed for previous feeders are effective.

7. Yellow Necked Caterpillar — Yellow and black striped caterpillar with prominent yellow spot just back of the head. Feed in groups and raise head and tip of abdomen when disturbed — One Generation generally. Sevin, Acephate effective.

8. Juniper Web Worm — An insect that may cause severe damage before it is recognized — Reddish brown caterpillar overwinters in the frass on branches. Penetrating sprays of Acephate, Diazinon, Sevin, Dymet in early spring or early fall needed for control. One Generation.

9. Green Stripe Maple Worm - A limited insect on Maple in river bottoms but a major defoliator when present. Two Generations — with the second being most damaging — Sevin, Acephate, Methoxychlor, Dymet.

10. Elm Leaf Beetle — Larvae feed on the lower leaf surface causing them to die and drop prematurely. More than one generation —

Sevin, Methoxychlor, Dymet and Acephate for control.

II. Sawflies and Leaf Miners

1. European — Eggs are deposited in needles in late fall. Look for symptoms on needles to determine potential problem. Use Acephate, Methoxychlor, Sevin in early stages. Other conifer sawflies develop during the summer.

2. Birch Leaf Miner — Small black fly-like wasp present when leaves are 1/2 grown signifies time to apply a protective control. Use Sevin, Diazinon, Acephate, Dimethoate before egg laying. After eggs are deposited, use Acephate or Dimethoate.

3. Arborvitae Leaf Miner — Small green caterpillar with black head that overwinters in mined leaves. Look for holes in Terminal Tissue. Adults are small moths. One Generation. Direct sprays in spring - Acephate

4. Locust Leaf Miner — Many plants skeletonized by adults. Mining occurs on black locust — Two Generations. Limited materials for control. Lindane and Dibrom are listed.

5. Other Sawflies — Skeletonized foliage or consumed foliage. Need to watch for damage as insects are sporadic. Most materials listed will give control.

III. Sucking Insects

1. Aphids — Often present on new growth. Use Malathion, Diazinon, Dymet, Acephate, Bendiocarb. Acephate and Bendiocarb have longer residual but new generations build quickly. Need to watch closely.

2. Spider Mites — Common on evergreens. Need to watch for off-color foliage. Spruce spider mite may be a problem at this time. As weather warms up, two spotted spider mite becomes more common. Kelthane, Malathion, Vendex, Dymet

3. Plant Bugs and Leaf Hopper — Common on honey locust as new

growth unfolds. Sevin, Dymet, Diazinon.

4. Lace Bugs — Found on hackberry, oak, Mt. Ash, Sycamore Elm, Azalea. Wings that appear lace-like due to many veins. Can cause much leaf browning. Several Generations — When severe — Use Malathion, Sevin, Acephate, Dymet, Methoxychlor.

IV. Borers

A. Clear Wing — Early season emergent holes. Use pheromone traps to detect activity. Protect new wood with Dursban or Lindane.

B. Beetle

1. Bronze Birch Borer — Severely damages white birches — Plant vigor is a factor but protection possible with Bendiocarb or Lindane — Timely application needed.

2. Flat Head & Round Head — Enter in wounded or weakened plant tissue. Little to no control once tissue is invaded. Plant vigor is major control.

V. Scale

1. Oyster shell crawlers — The early crawler stages of euonymus, oyster shell, oak kermes, golden oak and pine needle scale can be active at this time so plants should be carefully watched for activity. Acephate, Sevin, Diazinon, Malathion for control - Multiple Generations.

VI. Shoot & Tip Moths

a. Pine Tip shoot moths

b. Mugo pine shoot moth

Several species of shoot and tip moths needed to be treated for at this time of the year. Timing important and local pests need to be checked. Several materials are suggested including Sevin, Acephate, Dymet, Lindane, Bendiocarb and Dimethoate.

SUMMER INSECTS: These insects feed on mature or near mature foliage. Injury at this time may reduce the amount of sugar or carbohy-

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drates the plant can store up for bud development and winter survival in colder areas of the country. This may leave the plant in a weakened condition making it more susceptible to winter damage or other stress related problems that may eventually lead to the failure of the plant.

I. Foliage Feeders

1. Bag worms - Most common on narrow leaf evergreens but can be found on many other plants when population levels rise. Reasonable control can be obtained with Sevin, Diazinon, Acephate, Malathion, Methoxychlor, Bendiocarb when they are small but Dursban and Acephate are needed when more mature.

2. Japanese Beetles - Early to mid-summer favors the first emergence of this colorful but destructive insect. Favored host of prunus, apple, rose, elm and many other plants need to be protected with Sevin, Bendiocarb, Methoxychlor, Diazinon. A long residual is important.

3. Black Vine Weevil — Leaf notching on Taxus, Azalea, Rhododendron and numerous other plants in the landscape suggests weevil feeding. Black vine weevil common but several others may be present. Night feeders — Larval stages feed on roots. Control adults with Acephate, Bendiocarb, Lindane.

4. Imported Willow Leaf Beetle — Most willows attacked by this insect. Several generations. Sevin, Acephate, Methoxychlor — Timing important.

II. Sucking Insects

1. Lace Bugs — Off color and stippled pattern on leaf is common with shiny black fecal residue on under side of leaf. Common on Azalea, Rhododendron, sycamore, Pyracantha. Use Malathion, Acephate, Sevin, Dymet, Dimethoate.

2. Spider Mites — Hot weather will favor the build up of these insects often found on juniper and spruce but many other plants are susceptible. Many regular insecticides give little to no control of spider mites. Other materials must be used such as Dicofol, Dymet, Vendex etc.

3. Aphids — Different species are present during the growing season. Must be alert to build up, especially on new succulent tissue. Use Acephate, Diazinon, Malathion.

4. White Flies — Often found on the under sides of leaves of Azaleas, privet and foundation plants that result in a black sooty mold growing on the honey dew. Difficult to control insect due to life cycle. Acephate, Dymet, Diazinon, Dimethoate, plus others.

III. Scale Insects, Crawler Stages

1. Cottony Maple Scale - Cottony masses on silver maple and others.

Wait for all eggs to hatch for best control. Acephate, Diazinon, Sevin, Malathion.

2. Lecanium Scale-Wait for crawler stages to be active for control. Timing important — the materials are listed above.

3. Oyster Shell Scale-Watch for branch dieback or slow leaf development.

4. Pine Needles Scale

IV. Leaf Miners, Skeletonizers

1. Solitary oak leaf miner — Various leaf miners are active at this time. Early recognition and use of a protectant insecticide or use of a systemic material is needed.

2. Leaf Skeletonizer — These insects may be annoying in areas where an oak population exists — Two generations are often found. Similar insects occur on birch and other plants. The larvae that drop from a web and the white cocoons are annoying. Timing is more important than control materials of Sevin or Diazinon.

3. Needle Miners — Needles cut off and webbed together making branches unsightly. Use Sevin or Acephate early in spring and mid-summer.

MID-SUMMER TO EARLY-FALL:

Chewing insects that feed on foliage at this time of the year are often more unsightly than harmful to the plants. However, if the object is to keep foliage for the fall color change, one must be aware of these late season feeders. Life cycles of certain insects also dictates that control measures be employed at this time for optimum results and satisfied clients.

I. Scale Insects

1. Magnolia Scale — The crawler stage of this scale is active in the latter part of the growing season. Use Sevin, Diazinon, Malathion, Acephate on the crawler stage.

2. Pine Needle Scale — Second generations of this insect that can

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Spider mite damage to one untreated juniper is evident by off-color foliage.

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blow in or be carried by other insects and birds or were missed early in the season, can explode and nullify all previous treatment. Use Sevin, Diazinon, Dymet, and Acephate on the crawler stage.

3. Fletcher Scale — Watch for

crawler stage at this time of year on prone plants and use Sevin, Malathion, and Acephate.

II. Adelgids

1. Cooley Gall — This adelgid leaves the gall in late summer to

start a new life cycle or may return from fir trees if the alternate host of this pest is in the area. Good coverage of the new growth with Diazinon, Sevin or Malathion is important.

2. Eastern Spruce Gall — Similar in nature to the cooley gall, but activity is later so timing is important for the particular area.

III. Leaf Feeders

1. Fall Web Worms — The second generation becomes very obvious at this time of year with extensive webbing of the foliage. Suppression can be obtained with Sevin or Methoxychlor.

2. Japanese Beetle — This colorful insect is destructive on many other plants. Weather conditions play an important role in these numbers. Control with Sevin or Methoxychlor will be dependant on local analysis.

3. Mimosa Webworm — Webbing similar to fall web worm where leaves are pulled together. Several generations, Sevin, Acephate, Diazinon

4. Oak Leaf Skeletonizer — Second Generation on Oak.

IV. Borers

1. Locust Borer — A problem on black locust — Emergency occurs in the fall and egg laying is when golden rod in bloom. Lindane as a trunk protectant where a problem exists.

2. Peach Tree Borer — Mid-late summer treatment may be necessary on valuable plants. Use Lindane or Lorsban.

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ANSWERS TO TREE INSECTS

- A. aphids
- B. eastern tent caterpillar
- C. euonymus scale
- D. pin oak sawfly
- E. mountain ash sawfly
- F. dogwood borer (larvae)
- G. mimosa webworm
- H. willow leaf beetle
- I. spruce mite webbing/damage
- J. fall webworm
- K. gypsy moth (larvae)
- L. oystershell scale
- M. pine tube moth damage
- N. birch lead skeletonizer