Landscape Pests: Integrated Pest Management Strategies for Controlling the Dastardly Dozen

Mary K. Small
Colorado State University Cooperative Extension Urban Integrated Pest Management Agent

Karen L. Panter
University of Wyoming Cooperative Extension Service Horticulture Specialist

Cooperative Extension Service
College of Agriculture
B-1035
August 1999

UNIVERSITY OF WYOMING

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This booklet was written to help homeowners manage pests, and it emphasizes integrated pest management (IPM) techniques. Least toxic management options are presented first.

The authors would like to thank contributors Gary D. Franc, Michael J. Brewer, Mark L. Hughes, Laura P. Pottorff, and Whitney S. Cranshaw.

Colorado State University cooperated in the production of this publication.

Editor: Diana Marie Hill-Chavez
Layout: Tana Stith

A Few Words about Integrated Pest Management

Integrated Pest Management (IPM) uses a variety of methods to keep pest populations and their damage at acceptable levels. IPM seeks to manage, rather than eradicate, pests. Instead of finding an insect or disease on a tree and immediately spraying the tree, and in some cases the entire yard, IPM practitioners first identify the problem.

If the problem appears to be an insect that chews holes in the leaves, the next step is to monitor the area by spot checking a few leaves or stems for pest presence and damage. If the pest is a sucking insect, it will not make holes in the leaves. Thus, the damage found is unrelated to observed insects.

If a moderate number of insects are causing slight damage, monitoring should continue. Perhaps beneficial insects will show up and keep the pest population under control. Until then, a greater number of pests and their damage may have to be tolerated.

Pests can be managed mechanically. Dislodge them with water from the garden hose, or use biological tools such as insect predators or bacterial sprays.

If, despite these efforts, the infestation becomes intolerable, IPM practitioners select the least toxic pesticide to manage it. An ideal pesticide affects the pest without harming its natural predators. The pesticide should have a short duration period and low toxicity to humans and the environment. Apply pesticide to the affected plant parts, according to label directions. After using a pesticide, earlier efforts, such as monitoring and tolerance, can resume.

Because it is difficult to change attitudes and values, IPM is not always a favorite approach to pest management. The positive results of IPM include proper pesticide use, minimal effects on humans and the environment, and improved cost effectiveness.

Aphids

What are they?

Aphids are small, soft-bodied, 1/8- to 3/8-inch pear-shaped insects of various colors.

Examples of plants affected:

Honeysuckle, viburnum, cottonwood family members, elm, vegetable crops, flowers, pine, juniper, spruce, and fir.

What do they do?

Aphids suck sap from host plants.

Whitney S. Cranshaw, Colorado State University

Photo 1. Aphids.

What to look for:

Plant: Indicators that aphids are present include malformation of plant parts; curling leaves; a shiny, sticky substance on leaves, stems, and possibly objects underneath the affected plants; and ants moving up and down a plant (they may be there as aphid defenders and/or shepherds).

Pest: Aphids usually congregate on young, tender, succulent tissue, which is easiest for them to pierce with their sucking mouth parts.

Management options:

- Succulent growth is attractive to aphids. Avoid practices that encourage the development of excessive succulent growth, such as over-fertilization, improper pruning, and over watering.
- Monitor the aphid population and tolerate them until predators such as ladybugs, lacewings, and syrphid flies arrive.
- Plant small-throated flowering plants in the garden to attract aphid predators. These plants include dill, daisy, sunflower, yarrow, marigold, zinnia, candytuft, and goldenrod.
- Spray the host plant with water from the garden hose to wash off insects.
- Use insecticidal soaps, which are effective on soft-bodied insects. (Follow label directions.)
- Dormant oils may be used, except on evergreens, if the insects overwinter on the host.
- Ultra-fine oils can be used during the summer growing season to smother aphids on many plants, except on evergreens. (Follow label directions.)
- If using insecticides registered for use against aphids, spot treat the affected plant(s).

Note: Aphids are host-specific, so an infestation on one type of plant does not mean all plants in the landscape will be affected.

Borers

What are they?

Borers are the larvae of certain moths, wasps, or beetles.

Examples of plants affected:

Pine, lilac, ash, cottonwood family members, locusts, and birch.

What do they do?

Adults lay eggs on or under bark. After the eggs hatch, the larvae (worm-like creatures) chew

Michael J. Brewer, University of Wyoming

Photo 2. Borers and damage.

through the bark and begin tunneling into the wood underneath it, disrupting the flow of nutrients and water within the plant. Some insects, like the mountain pine beetle, introduce a fungus that plugs the conductive tissue of the tree.

What to look for:

Plant: Indicators that borers are present include low vigor plants; dead or dying plants or plant parts; sawdust on the ground beneath the plant or in bark crevices; sap oozing from exit holes, which range in size from pinhead to lead pencil diameter; and insect pupae skins found on the bark soon after the insect emerges from the plant.

Pest: Adult insects are not often observed.

Management options:

- Try to improve the tree's health through proper watering, pruning, and fertilizing techniques.
- If a pest is present, prune out infested twigs and branches, but avoid doing so during the adult's flight time. Fresh pruning wounds may attract them.
- If the borer species is known, spray trunks with insecticide when adults are normally expected to be flying and laying their eggs.

Note: Borers are normally attracted to stressed plants or those in weakened condition. Stress may be caused by a number of factors, including improper planting, watering, pruning, and fertilizing; competition; mechanical injury; and weather-related problems such as freezes. Once borers enter a tree, insecticides are not effective because the larvae are protected by the bark.

Cottonwood Blotch Leafminers

What are they?

Cottonwood blotch leafminers are the larvae of leaf-feeding beetles.

Examples of plants affected:

Cottonwood, aspen, and poplar.

What do they do?

The 1/8-inch, yellow and black adult beetle lays eggs between the leaf layers. The larvae feed there and tunnel in search of food.

Michael J. Brewer, University of Wyoming

Photo 3. Leafminer damage on cottonwood.

What to look for:

Plant: Indicators that cottonwood blotch leafminers are present include black, dry blotches on leaves, some of which drop prematurely.

Pest: Cottonwood blotch leafminers are tiny, worm-like larvae that are revealed when the blotch is torn open.

Management options:

- Do nothing. Approximately 80 percent of the leaves must be affected before plant health is in danger. It is primarily an aesthetic problem. Insecticides applied after blotches form do not kill the pest.
- Monitor leaves in June and July for the first appearance of the tiny mines. When found early, contact insecticides may be applied to reduce further egg laying and mine development.

Cytospora Canker

What is it?

Cytospora canker is a fungal disease that is spread by wind, splashing water, insects, and pruning tools.

Examples of plants affected:

Aspen, cottonwood, poplar, birch, willow, elm, and spruce.

What does it do?

Cytospora canker kills the tree's conductive tissue.

Mary K. Small, Colorado State University

Photo 4. Cytospora canker.

What to look for:

Plant: Indicators that cytospora canker is present include an orange-brown or yellow, possibly moist discoloration on the trunk and/or branches; moistness in the discolored area; dead or dying trees and branches; and slowed tree growth.

Pest: Cytospora causes areas of the bark to become sunken and discolored. The canker contains black, pimple-like spots.

Management options:

- Plant trees that are resistant to cytospora canker.
- Grow a healthy tree that will resist infection.

- Avoid wounding the tree with lawn mowers and weed whips, which stress it and provide potential openings for the fungus to enter.
- If only branches are affected, prune them off below the area of infection to a bud, twig, or side branch. Sterilize pruning tools between cuts with rubbing alcohol or a one-to-nine chlorine bleach-to-water solution. Rinse tools with tap water and dry.
- Remove dead or dying trees to reduce the chances of infecting other susceptible plants.

Note: The fungus causing cytospora canker is weak, colonizing only stressed plants. Stress may be caused by a number of factors including improper planting, watering, pruning, and fertilizing; competition; mechanical injury; and weather-related problems.

Fairy Ring

What is it?

Fairy ring is a fungal turfgrass disease.

Laura P. Pottorff, Colorado State University

Photo 5. Fairy ring.

Examples of plants affected:

All turfgrasses can be affected by this disease.

What does it do?

Fairy ring decomposes organic matter in soils and releases nitrogen, which is absorbed by turfgrass roots in the ring area, causing them to turn dark green. In other situations, a dense growth of fungal threads in the soil blocks water to turfgrass root systems, killing turf inside the ring area.

What to look for:

Plant: Indicators that fairy ring is present include complete or semi-circles of dark green turfgrass or dead turf. Grass plants immediately inside the dark green area may or may not turn brown and die.

Pest: Fairy ring may cause mushrooms to sprout in the ring area, particularly following heavy rains or irrigation. A white, moldy growth may be found by digging in the soil.

Management options:

- Tolerate it.
- A regular nitrogen fertilization program will help balance the difference in color between the lawn and the fairy ring. Avoid using excessive nitrogen because it may

stimulate the development of additional fairy rings.

- Use a pitchfork, core aerator, or tree root feeder to punch holes through the ring and 2 feet on either side of it. Irrigate the area deeply and infrequently during the growing season. A soapy water solution (1 teaspoon of dishwashing liquid in 5 gallons of water) may help wet the soil colonized by the fungus. The goal is to reduce drought injury to turf from the fungal threads.
- Dig and remove soil from an area 2 feet on each side of the ring to a depth of 12 to 18 inches. Replace with topsoil and reseed.

Fireblight

What is it?

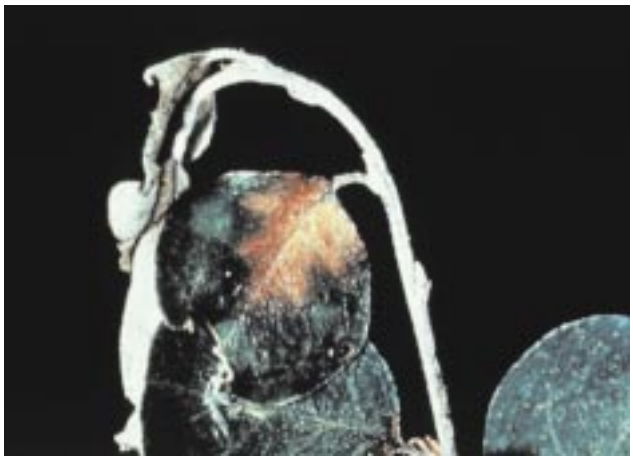
Fireblight is a bacterial disease spread by splashing water, pollinating insects, and pruning tools.

Examples of plants affected:

Apples, crab apples, mountain ash, pear, cotoneaster, and hawthorn.

What does it do?

The bacteria plug and kill the plant's conductive tissue.



Laura P. Ritchie, Colorado State University

Photo 6. Fireblight.

What to look for:

Plant: Affected parts rapidly blacken or scorch, as if by fire. Branch tips bend over, forming a characteristic "shepherd's crook." Affected flowers turn brown and drop prematurely. Fruit shrivels and hangs on the plant.

Pest: A creamy-colored liquid ooze is often found on the bark's surface in cankered areas or in infected fruit. The liquid contains the bacteria responsible for the disease.

Management options:

- Plant fireblight resistant plant varieties when available.
- Avoid excess nitrogen fertilization, as it stimulates the formation of tender, succulent stem tissue, which is ideal for bacterial colonization.
- Remove sucker growth that is succulent and susceptible to bacterial colonization.
- Avoid excessive pruning, which also stimulates the formation of tender, succulent stem tissue.

- Remove newly infected tissue, cutting at least 10 to 12 inches below a visible infection. Sterilize pruning tools between cuts with rubbing alcohol or a one-to-nine bleach-to-water solution.
- Before bacteria and plants resume growth in the spring, prune out cankered branches. Cankers are dark, sunken areas containing the fireblight bacteria.
- Spray streptomycin or Bordeaux mixture during blossom time, according to label directions.

Note: Streptomycin and Bordeaux mixture sprays are preventive, not curative, and will not eliminate an existing infection. The sprays alone are not sufficient protection against fireblight and should be used in conjunction with a good pruning program.

Gall Makers

What are they?

Gall makers cause abnormal plant growths due to feeding, egg laying, or the presence of certain insects' and mites' reproductive hormones.

Mary K. Small, Colorado State University

Photo 7. Aspen Gall.

Examples of plants affected:

Cottonwood, aspen, cherry, maple, willow, ash, spruce, hackberry, and honeylocust.

What do they do?

Gall makers cause the development of abnormal growths on trunks, stems, leaves, flowers, and fruits of plants. When gall makers affect buds, they occasionally slow or prevent new stem growth development.

What to look for:

Plant: Indicators that gall makers are present include unusual growths on leaves, stems, buds, flowers, and plant roots.

Pest: A few gall makers may be observed congregating around opening buds in the spring. Others are not noticeable. Adult gall makers include aphids, psyllids, mites, and adelgids.

Management options:

- Generally, gall control is unnecessary. Galls, with the exception of poplar bud gall mites, rarely affect plant health.

- Dormant oils may suffocate gall makers overwintering on the host plant.
- Apply insecticides when eggs hatch, which may be at bud break or blossom time, depending on the pest. Success with this technique is contingent upon appropriate weather conditions and presence of the insect/mite pest at treatment time.

Note: Gall makers are not considered harmful in most cases; they are primarily an aesthetic problem. Removal of the old galls may be done for cosmetic reasons; however, gall makers do not reuse the structure.

Aspen Leaf Spots

What are they?

Leaf spots of aspen are fungal diseases.

Examples of plants affected:

Aspen, cottonwood, and poplar.

What do they do?

The fungi cause spotting on leaves and premature leaf drop.

Mary K. Small, Colorado State University

Photo 8. Aspen Leaf Spots.

What to look for:

Plant: Indicators that aspen leaf spots are present include dark brown or black leaf spots that appear in early summer and are possibly surrounded by a yellow halo. Later in the season, spots may join to form larger ones. Small brown spots also may be found on the leaf stem (petiole).

Management options:

- Rake fallen leaves and dispose of them. The fungus overwinters in the leaves.
- Avoid overhead irrigation, which can splash spores of the fungus from one location on the plant to another. This causes the secondary infections to develop during the growing season.
- Space trees at planting time and/or prune to reduce dense growth. These techniques reduce the humidity around the leaves and should lessen infection.
- Apply a protective fungicide to susceptible plants at the following leaf stages: when buds start to swell, when leaves emerge, when leaves are one-half to two-thirds mature, and when leaves are fully expanded.

Oystershell Scales

What are they?
Oystershell scales are insects with a waxy covering.

Examples of plants affected:
Aspen, cottonwood, lilac, cotoneaster, and ash.

What do they do?
Oystershell scales suck sap out of the plant.

Mary K. Small, Colorado State University

Photo 9. Scale.

What to look for:
Plant: Affected plants may show wilting when leafed out; branches or stems may appear to be dead or dying.

Pest: Small, ¼-inch, brown or gray oystershells may be found alone or in clusters on trunks, branches, and stems. They may be thick and appear bark-like, especially on older plant parts. During the hatch period, the young, tiny, spider-like creatures (or "crawlers") may be observed on twigs and leaves.

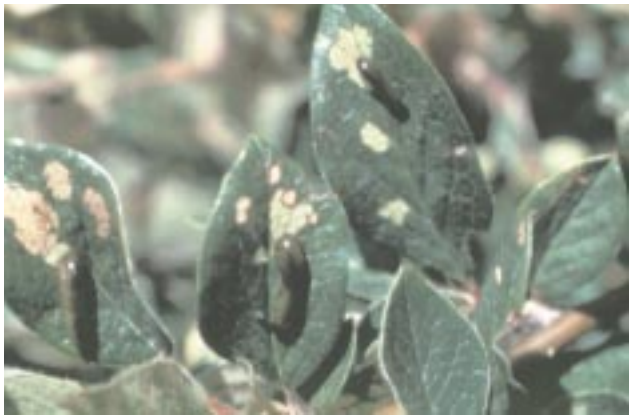
Management options:
- Gently scrub overwintering scale from trunks and stems with a nylon dish scrubber during the dormant period.
- Apply dormant oil sprays. These sprays provide only partial control of overwintering scales.
- Monitor for scale hatch in late April and May, depending on location. Apply lightweight summer oils when hatch is observed (follow label directions).
- Monitor for and apply insecticidal soaps during the insect's hatch period (follow label directions).
- Monitor scale hatch and use contact insecticides when it occurs (follow label directions).

Note: Usually, the oystershell scale insect observed is the mother's covering, which shelters approximately 50 eggs. The eggs hatch in May or June and hatchlings search for a place to settle down, begin feeding, and form their waxy covering. The crawler period, when the young are exposed and vulnerable, is the best time to control these pests because insecticides are unable to penetrate the protective scale cover. Check for scale hatch in your area by holding a white piece of paper under suspicious branches. Tap the branch and brush your hand against the paper. If streaks appear, scale insects are present.

Pear Slugs

What are they?

Pear slugs are the larvae of a sawfly, a wasp-like insect.



Michael J. Brewer, University of Wyoming

Photo 10. Pear slug larvae and damage.

Examples of plants affected:

Cherry, plum, and cotoneaster.

What to look for:

Plant: Indicators that pear slugs are present are brown spots on the leaves in July, August, and September. Upon closer look, the leaves are skeletonized; the veins are present, but the leaf tissue is gone. From a distance plants may appear scorched.

Pest: Pear slugs are ½-inch long, olive green, shiny, and slug-like.

Management options:

- Do nothing. Much of the time, the worst damage occurs late in the season, so plant health is not in danger.
- Apply a forceful spray from the garden hose to dislodge them.
- Try insecticidal soap sprays. These may cause leaf burn, so test spray a small area first.
- Spray recommended insecticides when pear slugs are first noticed.

Note: Often, two generations of pear slugs are born (July/August and September). Occasionally the first generation causes severe injury and control may be necessary to protect plant health. Although slug-like in appearance, pear slugs are actually insects.

Powdery Mildew

What is it?
Powdery mildew is a fungal disease.

Examples of plants affected:
Lilac, phlox, turfgrass, roses, many vegetable crops, and some house plants.

Mary K. Small, Colorado State University

Photo 11. Powdery mildew on lilac.

What does it do?
The fungus grows on plant surfaces, shading leaves and interfering with photosynthesis. The fungus' root-like structures enter the outer plant cells to obtain food.

What to look for:
Plant: Leaves may become discolored and distorted, turn yellow, and drop.

Pest: A talcum powder or flour-like substance coats the leaves of affected plants.

Management options:
- Tolerate it.
- Improve air circulation within and around the plant by pruning to reduce dense growth. High humidity is needed during part of the fungus' life cycle. Dense growth may create enough humidity to do the job.
- Avoid overhead watering to reduce infection. If practical, remove infected leaves to prevent subsequent infections.
- Rake and discard fallen leaves.
- Try the following formula for mildew treatment on roses, phlox, zinnia, and cucumbers only: mix 3 to 4 teaspoons of baking soda with 1 to 2 tablespoons of horticultural oil, add 1 gallon of water, and shake well. Periodically shake during application to keep the ingredients mixed well. If needed, reapply at weekly intervals.
- Use appropriate fungicides, according to label directions.

Note: Powdery mildew is host specific. The organism that infects lilac, for example, will not affect roses, turfgrass, or other unrelated landscape plants.

Spider Mites

What are they?

Spider mites are minute, spider-like creatures of various colors such as yellow, brown, red, and green.

Examples of plants affected:

Spruce, pine, juniper, ash, honeylocust, green beans, raspberries, roses, house plants, and marigolds.

What do they do?

Spider mites suck sap out of plants, stressing or killing them.

Whitney S. Cranshaw, Colorado State University

Photo 12. Two spotted Spider mite.

What to look for:

Plant: Indicators that spider mites are present include pale colored, minute spots ("flecking") on both deciduous and evergreen leaves, leaf or needle discoloration ranging from yellow to gray-green to bronze, loss of leaf luster, premature needle or leaf drop, and poor plant vigor. In heavy infestations, a dusty webbing may be present. Black, soil-like grains (spider mite excrement) often are observed on the underside of affected leaves.

Pest: Hold a white sheet of paper underneath affected branches or leaves and tap. Brush your hand against the paper. If red or brown streaks appear, spider mites are present. Mites also may be observed with a hand lens.

Management options:

- Carefully manage water. Spider mites are especially attracted to, and proliferate on, drought-stressed plants.
- Hose off the plant. The force of the spray will knock the mites off the plant.
- Apply insecticidal soaps. These work well on soft-bodied creatures like spider mites.
- Use sulfur dust, according to label directions.
- Apply insecticidal oils, except on evergreens, following label directions. Do not use oil and sulfur within 30 days of each other.
- Apply miticides, products specifically designed to kill mites, when damaging populations are present.

Note: Spider mites are not actually insects, they are arachnids, members of the spider family. They have four pairs of legs, unlike insects, which only have three pairs.