



IPM Series: Boxwood

Symptoms	Possible Causes	Notes
Leaf Yellowing	Macrophoma Leaf Spot Volutella (Canker) Root Rot Winter Damage Meadow Vole Nematodes	Tiny black spots on leaves Pink spores on leaves during moist conditions in spring Eventual dieback from the top of the plant Leaves eventually turn brown Larger branches dieback; bark stripped from base of the plant Reduced root system
Leaf Stippling	Boxwood Mite	Fine stippling of leaves early in season, followed by general grayish, dingy, unhealthy appearance
Cupped leaves	Boxwood Psyllid	Damage appears on new terminal leaves in spring
Blistering of young leaves	Boxwood Leafminer	Blotch mines, underside of leaves appear blistered from late summer through following spring
Branch Dieback	Oystershell Scale Volutella Canker Root Rot	Oystershell shaped scale covers found on bark of affected branches Pink spores on leaves during moist conditions in spring Eventual dieback from the top of the plant
Meadow Vole	Larger branches dieback; bark stripped from base of the plant Nematodes	Reduced root system

Care of Boxwoods

Boxwoods grow well in full sun to partial shade. Sites exposed to full winter sun can cause foliage to “burn” and turn orange. Boxwoods planted with a south or southwest exposure suffer winter burn more than plants with an east or north exposure due to increased sun exposure.

As with all evergreens normal leaf drop does occur, but leaves normally remain functional for 3 years. Boxwoods are broad leafed evergreen shrubs that are typically used as foundation plantings and backdrops for planting beds, topiaries, and formal gardens. There are many cultivars and species available, but the two most common are American boxwood (*Buxus sempervirens* ‘Arborescens’) and English boxwood (B.s. ‘Suffruticosa’).

Boxwoods require adequate drainage, ample amounts of organic matter and grow best within a soil pH range of 6.5 to 7.2. Yellowing of older inner foliage or premature leaf drop may indicate a lack of nitrogen. Granular fertilizer with a 10-6-4 analysis applied at the rate of 1 lb. per 100 sq. feet, is sufficient in most situations. Broadcast the fertilizer around the base of the plant just beyond the drip line. The best time to apply fertilizer is in October or November.

Boxwoods have a shallow root system and over-application of fertilizer may kill the roots, causing yellowing and browning of the leaves. Apply fertilizers when there is adequate soil moisture or water fertilizer in after application. (Do not cultivate deeply near the boxwoods or shallow roots will be damaged.)

Boxwoods require only light applications of mulch. Do not apply more than one inch of mulch over the root zone and keep it clear of the main stem. Excessive mulch may encourage vole activity and production of adventitious roots in the mulch layer which are very prone to desiccation (drying) damage.

The most appropriate pruning method for English boxwoods is thinning. Thinning allows the center of the plant to receive adequate sunlight and air circulation. Properly pruned boxwoods will have leaves along the entire branch length. Dense foliage encourages fungal diseases such as macrophoma leaf spot and volutella canker. Shearing stresses plants and should only be used in boxwood topiaries. The best time to thin boxwoods is December through February.

Cultural Problems

Winter Injury

Winter injury may be confused with early stages of the fungal diseases phytophthora root rot or volutella blight. Leaves turn from bronze to reddish brown as a result of exposure to cold, dry winter winds. Tissue death is caused by the removal of water in the leaves faster than the plant can replace it through root uptake from frozen water in the soil. Bark splitting can be caused by a rapid temperature drop caused by a mid-winter thaw. Dead twigs and branches in the spring may be the result of ice and snow damage from the winter.

Prevention: Winter damage can be reduced by locating plants in partially shaded areas protected from winter winds. Physical barriers, placed about 18 inches from the plants on the windward side, made from materials such as burlap or plastic, can also lessen winter wind damage by reducing wind velocity. Maintain adequate soil moisture in the fall to prevent winter desiccation. To avoid damage from falling snow and ice do not plant boxwoods under roof eaves. For established boxwoods, tie a string or twine at the base of the plant and spiral the twine up and down the plant to hold it together and gently brush snow off plants as soon as possible. This will help prevent damage from falling ice and snow. Inspect plants for winter damage in the spring and prune out affected areas.



Winter damage on Boxwood

Animals

Meadow Vole

Microtus pennsylvanicus

Older boxwood plantings that are neglected and overgrown with weeds are prime candidates for vole damage. Voles damage boxwoods by girdling the base of the plant, feeding on roots, and tunneling through the root system. They cause plant damage primarily in fall and winter. Voles or meadow mice are found throughout Maryland. A vole is the same size as a house mouse, with small eyes and ears and a short tail. The color may vary between gray and brown. Voles are often confused with moles, but they are very different in their feeding habits and are not related to them. Moles live underground and feed on soil insects and earthworms. Voles are plant feeders and usually live on the surface but may travel in mole tunnels.

Control: Voles can be controlled by habitat modification and trapping. Use no more than one inch of mulch as deep mulch provides habitat for voles. Keep boxwood plantings free of weeds which provide protection for the voles. To reduce vole populations, mouse traps baited with apple slices or a peanut butter-oatmeal mixture should be placed across surface runways. Many predators prey on voles, including black rat snakes, owls, cats, etc.

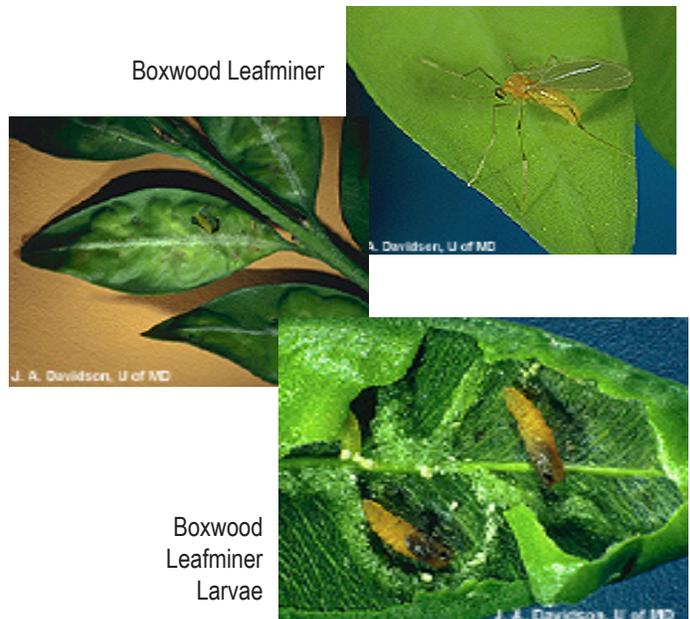
Pests

Boxwood Leafminer

Monarthropalpus buxi

The most destructive insect pest of boxwood is the boxwood leafminer, *Monarthropalpus buxi*. The larvae of this fly feed on the tissue between the outer surfaces of the leaves. This feeding results in blotch shaped mines in the boxwood leaves. The infested leaves appear blistered from late summer through the following spring. New leaves do not show signs of mining until late summer when the larvae are larger. By fall, or in early spring, premature leaf-drop may result from heavy infestation.

Boxwood Leafminer



Boxwood
Leafminer
Larvae

Adult leafminers emerge in late April or early May, depending on the weather. The adults are small (3mm), orange, mosquito-like flies. The adult flies emerge over a period of 10-14 days but each fly only lives about 24 hours. After mating each female inserts about 30 eggs in the surface of new boxwood leaves. The larvae hatch in about 3 weeks, and feed within the leaves from June through early fall. They spend the winter in the leaves, and pupate the following April. There is one generation each year. Many cultivars of *Buxus sempervirens* and *Buxus microphylla* var. *Japonica*, are relatively resistant to this pest.

Control: To control the adult leafminers, thoroughly spray the plants with a registered insecticide in late April. If developing mines are observed, larvae can be controlled from late June through the summer by spraying with a registered systemic insecticide. It is best to control larvae in June before serious damage has occurred.

Control: Boxwood psyllid nymphs may be controlled with horticultural oil, or insecticidal soap sprays in April and May. Adults may be controlled by a registered residual insecticide in late May into June. Sprays are only necessary if infestations are heavy.

Boxwood Mite *Eurytetranychus buxi*

The boxwood mite, *Eurytetranychus buxi*, is most commonly found on *Buxus sempervirens* cultivars. The mites are yellowish-green or reddish, and are 0.5mm long. The yellow eggs overwinter on the leaves and hatch in April. These spidermites breed rapidly and have 5 or 6 generations a summer. Injury shows as a fine stippling of the leaves early in the season, followed by a general grayish, dingy, unhealthy appearance. Japanese boxwood is less susceptible to the mites, but its cultivars are very susceptible.

The Boxwood Psyllid *Psylla buxi*

Psyllid
adult



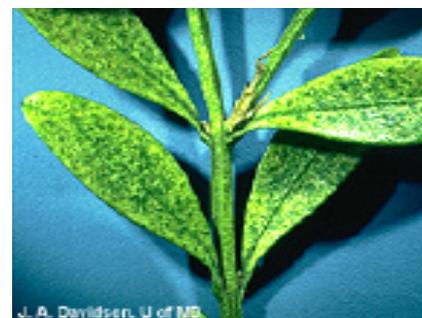
Winter damage on Boxwood



Psyllid damage
on Boxwood



The boxwood psyllid, *Psylla buxi*, causes a characteristic cupping of the leaves on the terminal and lateral buds of boxwood. This insect can overwinter as an egg, or as a first instar nymph under the bud scales. As the buds develop in the spring, the eggs hatch and nymphs emerge to infest the leaves. The feeding causes the leaves to curl and form a cup which encloses the greenish colored nymphs. The nymphs produce a white, waxy secretion which may cover part of the body or small waxy pellets beside the nymphs. The greenish adults emerge late May into June, mate and lay eggs under the bud scales. Only one generation occurs each year. This pest causes aesthetic damage to American boxwood and English boxwood.



Mite damage

Control: To control boxwood mite, apply a dormant rate of horticultural oil to the undersides of the leaves before new plant growth begins in the spring. Light, summer populations of mites may be controlled with a summer rate of horticultural oil or insecticidal soap sprays. Heavy infestations may require a residual miticide application. A biological control option for heavy mite infestations may be the release of phytoseiid predatory mites that can be purchased from mail order sources. (See Beneficial Insects and Mites, Mimeo HG6.)

Oystershell Scale *Lepidosaphes ulmi*



Oystershell Scale

Heavy infestations of this armored scale will cause yellowing and wilting of leaves and eventual dieback of branches. Infested plants have an unthrifty appearance. To monitor for this pest look for tiny (3mm), oystershell shaped, brown to gray, scale covers on the bark of wilting or dead branches. There may be one or two generations a year. Crawlers, newly hatched scale

insects, are about the size of a pin head and light colored. Look for crawlers near the old scale covers in May.

Control: Prune out heavily infested branches. A dormant oil (3-4%) spray may be applied in late winter. Be sure to thoroughly cover all of the branches. A summer spray (2%) of horticultural oil may be applied in late May.

Diseases

Root Rots

Phytophthora spp. and
Ganoderma lucidum

The fungi, *Phytophthora spp.* and *Ganoderma lucidum*, cause a root rot in both English boxwood, *Buxus sempervirens* 'Suffruticosa', and American boxwood, *Buxus s.* 'Arborescens'. Symptoms include poor growth, loss of healthy foliage color (leaves eventually turn light yellow), upward turning and inward rolling of leaf margins, dark brown discolored wood at the base of the stem for 2 or 3 inches above the soil line, and loosening and separation of the dead lower bark. As a result of the fungal infection, the root system is reduced and dark brown.

Control: Although there are no chemical cures for these diseases they can be prevented by proper planting. Avoid planting boxwoods in poorly drained compacted soils or in low areas where water collects. Also avoid placing boxwoods near downspouts. Construction of raised beds or grade changes may be needed to ensure proper drainage. Root diseases on older established plants can result from changes in water drainage patterns.

Volutella Stem Blight or Canker

Pseudonectria rouselliana

Both American and English boxwood are susceptible to this disease caused by the fungus, *Pseudonectria rouselliana*. The imperfect stage is *Volutella buxi*. Before new growth appears in the spring, leaves on the tips of infected branches turn red, then bronze and finally yellow. Infected branches die back. Examination of affected branches reveals loose bark and girdling at varying distances from the tips and discoloration of the wood. In moist weather the fungus produces salmon pink fruiting bodies on leaves and stems.

Control: Diseased branches should be pruned out and when the foliage is dry, plants should be thinned to improve air circulation and light penetration. Old fallen leaves and diseased leaves that have accumulated in the crotches of branches in the interior of



Volutella stem blight

the plant should be shaken out and removed. Properly timed applications of copper fungicides or lime sulfur applications can be used in severe infections. Sprays will not cure diseased branches. Spray applications should start just before new growth begins in the spring and continue until new growth is completed. Additional sprays may be needed in the fall to protect late summer growth during rainy seasons. Adequate spray coverage is essential for disease control and thick foliage will prevent spray penetration which will reduce the effectiveness of disease control.

Macrophoma Leaf Spot

Macrophoma candollei

Both American and English boxwood are susceptible to infection by the weakly parasitic fungus, *Macrophoma candollei*. The most obvious symptoms are the many tiny black raised fruiting bodies found on dying or dead straw-colored leaves.

Control: Generally no controls are needed for this disease.

Nematodes

Lesion Nematodes, *Pratylenchus spp.*

Spiral Nematodes, *Helicotylenchus spp.* and *Rotylenchus spp.*

Several different nematodes can cause root damage on boxwoods. Symptoms include stunted growth, leaf yellowing and branch dieback and a reduced root system. Plants generally appear to be in decline and are smaller than normal. Infested roots are killed and continued invasion of new roots results in a dense proliferation of small undersized roots.

Control: There are no chemical pesticides available for nematode control. The only way alleviate nematode damage symptoms is through proper cultural practices.

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