



**Boxwoods for
Pennsylvania
Landscapes**



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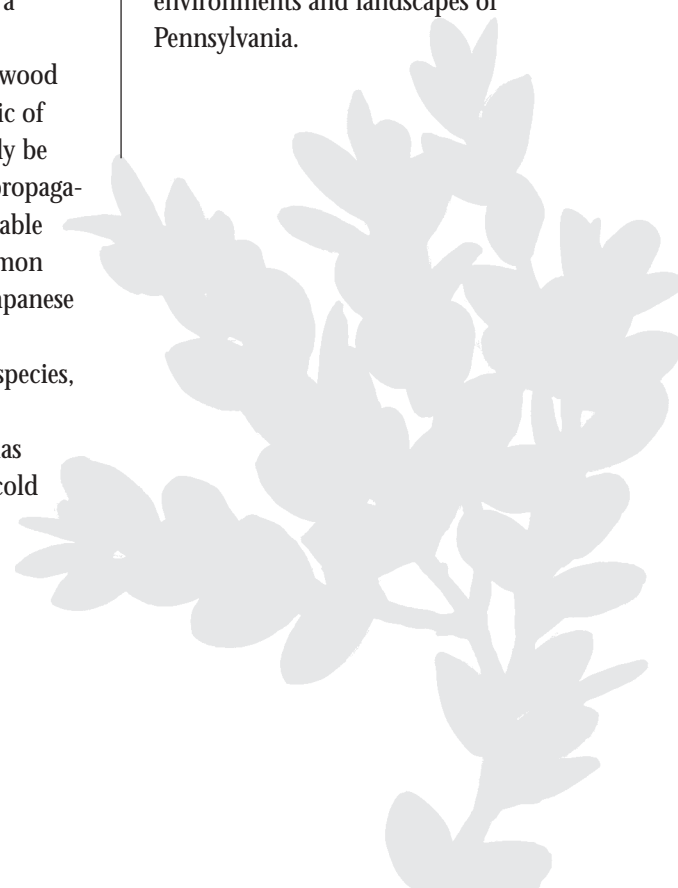
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inter in many parts of Pennsylvania provides a stark, leafless, snow-covered scene among the deciduous hardwoods, intermixed with dark green patches of hemlock and other needle-leaved evergreens. Many homeowners look to enhance this beautiful scene with broadleaf evergreens in their landscape. There are a number of broadleaf evergreen shrubs to choose from that are suitable for the Pennsylvania landscape, including pieris, mountain laurel, leucothoe, mahonia, pyracantha, leatherleaf viburnum, rhododendron, holly, and boxwood. Most of these plants provide a rounded and spreading habit. For formal gardens, hedges, or sites where a specific plant form is desired, Japanese holly and boxwood are the most common choices.

Boxwoods (*Buxus*) are native to Europe, the Mediterranean, the West Indies, Asia, and Central America. The genus *Buxus* consists of thirty species, of which there are approximately 115 different cultivars and species commercially available. A cultivar is a plant of a particular species, such as "Elegantissima," a common boxwood that shows a unique characteristic of variegated leaf color that can only be reproduced through vegetative propagation. The most commonly available species are *B. sempervirens* (common boxwood) and *B. microphylla* (Japanese or Littleleaf boxwood) and their cultivars. A third less, common species, Korean boxwood (*B. sinica* var. *insularis*), is also available, and has provided a source for increased cold hardiness.

Each species contributes unique characteristics, including size, color, insect resistance, and foliage. Common boxwood is a wide-spreading species with very dense, evergreen foliage and cold tolerance to about -5°F. The leaves are dark green above and yellow-green below, reaching 1/2" to 1 1/2" in length, and are oblong to oval in shape. Japanese boxwood is a low-growing, compact, heat-tolerant shrub with bright green leaves that are elliptical to lance-shaped, and reach 1/4 to 1" in length. Korean boxwood is a loose, open-growing shrub that is very hardy, although the foliage may turn yellow to brown in the winter. In the nursery and landscape trade today, numerous varieties and hybrids among these species have been created and marketed for their unique characteristics, including round, dwarf, and columnar forms, winter hardiness, and variegated foliage. Among the boxwoods on the market, the following list represents cultivars of various forms and characteristics that may be useful in the many different environments and landscapes of Pennsylvania.



Botanical Name	Cultivar Name	Zone	Height	Width	Adaptation and Remarks
Upright Forms		Use: Specimen, doorway, or corner accent			
<i>B. sempervirens</i>	'Dee Runk'	6	10-12' at 25 yrs	2-2.5'	Conical grower, distinctively upright when pruned to central leader. Performs well in heavy soils compared to other uprights. One of the best upright cultivars.
<i>B. sempervirens</i>	'Fastigiata'	6	12' at 40 yrs	5'	Moderately fast conical with minimal bronzing in winter. One of the richest green colors among uprights. Second in tolerance to heavy, poorly drained soils.
<i>B. sempervirens</i>	'Graham Blandy'	6	10-12' at 25 yrs	1-1.5'	Columnar with new, succulent growth bending out and downward. Less effective than above two. Prone to root-rot problems in heavy soils.
Very Dwarf		Use: Edging, specimen, bonsai, or dwarf garden			
<i>B. microphylla</i>	'Grace Hendrick Phillips'	5-6	1-1.5' at 25 yrs	3-3.5'	Annual growth of 1/2" to 1/4" in height by 1 1/2" to 2" in width. Rich green foliage. Excellent dark color when placed in shade rather than full sun.
<i>B. microphylla</i> var. <i>japonica</i>	'Morris Midget'	5-6	18" at 40 yrs	3'	One of the most compact mounded cultivars, with 1" growth each year. A smoother appearance than its sister 'Morris Dwarf.'
<i>B. microphylla</i>	'Green Pillow'	5	30" at 30 yrs	40"	Low-mounding and slow-growing. Holds new, light-green foliage longer than others. Foliage may be frosted in fall.
<i>B. microphylla</i> var. <i>japonica</i>	'Morris Dwarf'	5-6	3' at 40 yrs	4.5'	A compact plant originating from an open-pollinated seedling at the Morris Arboretum in Pa. The tufted bush outline is the result of clusters of 2-3" brittle shoots. Shoot reversions are possible, requiring monitoring and pruning.
Slightly Dwarf to Medium Size		Use: Edging, specimen, and formal gardens			
<i>B. sinica</i> var. <i>insularis</i>	'Nana'	6	18" at 17 yrs	3'	A low, broad-spreading grower. Commonly called dwarf Korean. May require annual tipping of the branches to improve their rigidity. Site sensitive, this plant with its rich green, foliage is most attractive in shaded sites. Spring offers a crisp, lime-green color due to new growth.
<i>B. sempervirens</i>	'Jensen'	6	12"	6"	A newcomer and relative unknown from southeast Pa., this plant produces beautiful, bluish-green foliage and resembles 'Suffruticosa' in foliage shape, and growth habit. Little is known about this plant's maximum height.
<i>B. sinica</i> var. <i>insularis</i>	'Justin' Brouwers	6	2-2.5' at 25 yrs	3.5'	A seedling originating from Williamsburg, Va. and resembling English boxwood. Producing narrow, dark-green foliage on a dwarf-mounding plant. This cultivar appears more tolerant to sun and heavy soils than English boxwood. Richer foliage will be found if it is grown in some shade. The leaves are pointed and produce delightfully soft spring foliage. This cultivar needs little pruning and can be allowed to grow naturally. Sensitive to exposed sites.

Botanical Name	Cultivar Name	Zone	Height	Width	Adaptation and Remarks
Medium Size		Use: Christmas decorations, topiary, hedges, and specimen			
<i>B. sinica</i> var. <i>insularis</i> <i>B. sempervirens</i>	'Green Mountain'	4	5' at 20 yrs	3'	The fastest growing of the Sheridan Nurseries (Ontario, Canada) releases, this plant can be a striking conical or columnar form with pruning.
<i>B. sinica</i> var. <i>insularis</i> <i>B. sempervirens</i>	Chicagoland Green™ 'Glencoe'	4	3-4' at 15 yrs	5'	A patented cultivar from the Chicagoland Grows Introduction Program of the Chicago Botanic Garden, 'Glencoe' was introduced because of its cold hardiness, uniform oval-rounded habit, attractive green winter color, and ease of propagation. Field-grown plants exhibited no measurable damage after exposure to record-low temperatures of -27 degrees F during 1993-1994.
<i>B. sempervirens</i>	'Suffruticosa' (English)	6	4' at 50 yrs	5'	A colonial and modern favorite, formal and dense in its growth habit, forming a rounded cloud and growing 1-2" each year. Prefers a soil pH above 6, protection from southern and western exposure, dappled shade, and protection. This cultivar is susceptible to "boxwood decline." One by one, large branches turn from green to yellow and slowly the entire plant dies due to a root-rot pathogen. Full-sun plantings are most susceptible, although crowded centers with no air circulation may contribute to its decline.
<i>B. sinica</i> var. <i>insularis</i>	'Wintergreen'	5	4' at 15 yrs	6'	Considered one of the hardiest cultivars, with a broad, vase-shaped habit. There are many different plants under this cultivar name, some with a larger sempervirens-type leaf and others in the Midwest with the characteristic small, sinica leaf shape. 'Wintergreen' is a great Japanese holly substitute. It requires some shearing to maintain its light shape. A very fast grower and difficult to maintain as a formal plant. Usually maintains good color through winter. A heavy seed producer.
<i>B. sempervirens</i>	'Vardar Valley'	4-5	4' at 30 yrs	10'	A willowy spreader, this cultivar remains open and very hardy. Originating from Macedonia, this plant's bluish-green foliage in springtime adds distinctive class to the landscape, giving way to a rich green later in the season.
<i>B. microphylla</i> var. <i>japonica</i>	'Green Beauty'	6	3-7' at 15 yrs	3-4'	An excellent dark, winter color, and adaptability to sunny and exposed sites, makes this cultivar a possible substitute for English boxwood. Clipping annually to remove leggy shoots will help to maintain its spherical shape. This cultivar appears a bit more brittle than most.
<i>B. sinica</i> var. <i>insularis</i> <i>sempervirens</i>	'Green Ice'	4	3'	3'	Patented by Conard-Pyle, this plant is considered super hardy, maintaining a deep-green winter color. The new spring growth is blue-green, which turns a glossy, deep green in the summer, resembling its <i>B. sempervirens</i> parentage. Little is known about the maximum size of this plant.
<i>B. microphylla</i>	'Jim's Tru Spreader'	5	3' at 15 yrs	4'	A Pa. introduction by Jim Stauffer, this var. japonica cultivar appears extremely winter hardy and adaptable. Similar to 'Green Beauty,' but has a more spreading habit and is hardier.

Botanical Name	Cultivar Name	Zone	Height	Width	Adaptation and Remarks
Large Cultivars		Use: Christmas decorations, topiary, hedges, and specimen			
<i>B. sempervirens</i>	Common or American	5	12' at 50 yrs	9'	A colonial favorite, often called tree boxwood, this plant is a benchmark standard for boxwood. An upright or pyramidal form, this plant is a fast grower that will tolerate more open sites than English boxwood. Susceptible to root-rot diseases, this plant needs a well-drained soil. To prevent light bronzing of the foliage in winter, plant in a protected site under trees and away from southwestern exposure.
<i>B. sempervirens</i>	'Elegantissima'	6	12' at 40 yrs	6'	Outstanding and distinctive boxwood with creamy, white edges around each leaf, offering a contrast in the landscape. A moderate grower that is cold-sensitive. Some shade enhances the contrasting foliage. Growing under pine trees or other shade structures may also provide the type of winter protection this cultivar requires.
<i>B. sempervirens</i>	'Inglis'	5	7' at 20 yrs	6'	First recognized in Michigan, this plant appears to grow more slowly than common sempervirens and appears more controllable, yet it can fill a space quickly. Susceptible to root rot in heavy soils. In early tests, it appears to be coming through winters with a rich color and good, tight form.

Boxwood Culture

Most boxwood cultivars require protection, mainly to avoid mid- and late-afternoon sun damage during both the winter and the hot days of summer. Winter sun damages boxwood by discoloring the foliage almost immediately, and extended damage weakens the plant, often resulting in death. Late-afternoon winter sun creates two problems for boxwoods: the bronzing or discoloration of foliage, and the overheating of foliage and stems, followed by freezing of the tissues after sunset when temperatures drop rapidly. This rapid temperature change in active and warm tissue can burn tender leaf tissue and cause frost-cracking of exposed stems and branches. Thoughtfully locating the plants in protected sites, overhead shading from canopy shade trees, and the use of artificial barriers such as snow fences, will relieve the drastic day and night temperature fluctuations, thus reducing the likeli-

hood for overheating and super-cooling of the plant's tissues.

Locating plants in the landscape requires an understanding of your individual landscape conditions. When placing boxwoods in a landscape, the north side of a structure or landscape planting is preferred, followed by the east side, then the south side, and lastly the west side. The north side of a building, structure, or taller landscape planting prevents direct sun light from striking the plants. Planting boxwoods on the east, south, and west sides of a structure, building, or taller landscape planting can result in direct exposure to sunlight in the morning, during the day, or in the evening. Where a northern location is not possible, careful selection of tolerant cultivars and temporary shelters are alternative approaches to adding boxwoods to your landscape.

Boxwoods are sensitive to drought. Newly planted boxwoods require

attention to watering during the first growing season to prevent the soil from drying out around the roots. The soil should be slightly moist below the surface all year round. As a general guide, boxwoods should receive about 1" of rain every ten days. Keep track of rainfall and supplement as necessary with a long, slow soaking from a soaker hose or trickle irrigation. Adequate water should be applied to penetrate into the top 6 to 8" of soil. Mulching will help to conserve moisture around the plants. Established boxwoods should be watered in the spring and early summer if adequate rainfall is not recorded. Plants that are drought-stressed in the spring and summer may produce an overabundance of late summer or early fall growth if rain levels increase. This new succulent growth may not harden-off properly and may freeze during the winter. If rainfall levels remain low in the fall, soak the ground with water to a depth of 6 to 8" prior to the ground freezing to assure a moisture source for the plant through the winter.

Listed below are some key arthropod pests and diseases that cause injury to boxwoods in Pennsylvania. Management suggestions are also provided for these species. Consult your current woody ornamental pest management guide for formulations registered for management of these pests.

Boxwood leafminer

The boxwood leafminer, *Monarthropalpus flavus* (Schrank), is a key pest of Pennsylvania plantings of boxwood, *Buxus* spp. It was first reported as a pest in the United States in 1910. It is now found coast to coast wherever boxwood grows.

The eggs are white to transparent, and they hatch to small, whitish to lemon-yellow, 3 mm long larvae (maggots). Adults are small, yellow to orange-red, 2.5 mm gnat-like flies.

This species overwinters as larvae in the leaf blister. During the spring this blister develops a translucent “window.” The larvae change into the resting stage (pupae). During May, the pupae wriggle through the blister “window” and protrude from the lower leaf surface. Adults emerge from these pupal cases during May and mate soon after emerging. Mated females deposit eggs into new foliage by thrusting a curved, needle-like ovipositor through the lower surface of the leaf. Eggs may be seen easily, especially on new growth, by holding the leaf up to the light. After laying an average of twenty-nine eggs, the female dies. Eggs hatch into young larvae in about 14–21 days. Larvae continue to grow and feed in the leaf through the remainder of the summer. One generation of this pest occurs each year.

The larval stage of this pest can cause extensive damage to the foliage. Injury to the host plant is caused by this stage feeding between the upper-and lower leaf surface. Feeding produces a blister on the leaf that may or may not become discolored. Heavily infested leaves may contain several leaf blisters, and the entire leaf may become puffed or swollen. Infested leaflets often drop prematurely, resulting in ragged-looking plants with occasional dead twigs. Most varieties of boxwood are attacked by this pest.

To manage this pest, apply registered insecticides, according to label directions, during May.

Boxwood mite

The boxwood mite, *Eurytetranychus buxi* (Garman), is primarily a pest of boxwood, *Buxus sempervirens*. It is a common and widespread species.

This pest overwinters in the egg stage. One female may lay 25–35 eggs. The lemon-yellow eggs hatch from late April through early May. Eggs hatch in 6 to 10 days, and the yellowish-green larvae start to feed on the host plant. Nymphs are green to yellowish-brown. Adults may live for 2 to 5 weeks. This species completes one generation in 18 to 21 days, and at least eight generations are produced each year in Pennsylvania.

Feeding injury on boxwood first appears as mottling, followed by yellowing and browning near the midvein on the lower leaf surface. Small comma-shaped spots are apparent on the upper leaf surface of infested plants. Heavily damaged foliage becomes bronzed and may drop prematurely. All life stages may be found at one time on severely infested plants, on both the upper and lower leaf surfaces. This species prefers to feed on tender shoots and the upper surface of young foliage. In warm and dry growing seasons, this pest becomes very abundant and may cause considerable damage.

Dormant horticultural oil should be applied according to label directions, during the overwintering egg stage. Infested plants also can be treated with registered miticide formulations when active life stages of this pest are present.

Boxwood psyllid

The boxwood psyllid, *Cacopsylla buxi* (Linnaeus), is a common pest of boxwood, *Buxus* spp. It is not considered as destructive as other boxwood pests. Plants of common boxwood, *B. sempervirens*, appear to be most susceptible to this pest.

Its eggs are very small, orange, and spindle-shaped. Nymphs have piercing-sucking mouthparts and are covered with a white, waxy secretion that readily distinguishes them from other insects that attack boxwood. Adults are about 3 mm long, and greenish in color.

This species overwinters in the egg stage. The eggs are laid between bud scales of the host bush during early summer and start hatching as soon as buds begin to open in early spring. Young nymphs immediately begin to feed on plant tissue by removing fluids. Nymphs develop on newly expanding foliage. Leaves become cupped and can enclose several nymphs inside a pocket of foliage. The nymphs usually mature into adults by early June. After mating, adults deposit eggs that overwinter on the host plant. One generation occurs each year in Pennsylvania.

Feeding damage is very noticeable due to the leaf-cupping effect that young nymphs produce on host plants. Leaf cupping results from injury to tissue as it is formed in rapidly expanding leaves. Occasionally, young twig growth is affected by this species.

To effectively manage this pest, treat infested host plants with a registered insecticide when nymphs are present in early May.

Decline

During boxwood decline, plants are stunted, and dieback of middle and upper branches occurs. Young foliage turns gray-green or bronze and finally straw color, while old leaves fall prematurely. Sunken cankers form on the trunk at the soil line, or on branches in the crotches where dead leaves accumulate. Wood under the sunken canker is blackened.

Decline is the result of attack by various fungi. Nematode feeding on roots contribute to the decline, as does damage from winter injury and the stress on plants in poorly drained sites. To manage decline, protect plants from winter injury and flooding stress. Prune dead branches well below cankered areas. Remove dead leaves accumulated among the branches. If the shrub is removed, do not replace it unless the soil is first fumigated and aerated, or treated with a nematicide before planting.

Leaf spot

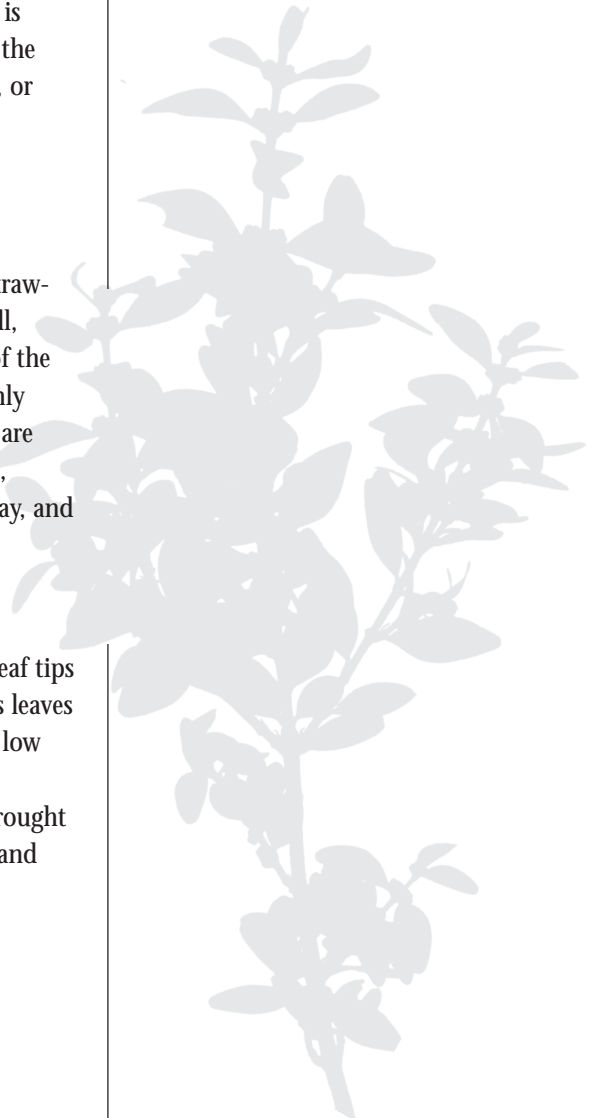
When a boxwood has leaf spot, straw-yellow leaves are dotted with small, black, fungal-fruited structures of the fungus *Macrophoma candollei*. Only leaves weakened by winter injury are infected. To manage this leaf spot, protect plants from wind, salt spray, and salt runoff.

Leaf burn

When a boxwood has leaf burn, leaf tips and margins yellow and redden as leaves fall prematurely. Water stress and low temperatures result in leaf burn. Therefore, protect shrubs from drought and drying winds in the autumn and winter.

Nematodes

Root-feeding nematodes, including *Pratylenchus*, slow growth and cause stunting. The leaves of nematode-infected plants have a bronzed appearance and the shrub declines. Small roots have small, brown, dead areas that enlarge to engulf the entire root ends. There are no adequate controls once the plant is infected. If the shrub is removed, do not replace it unless the soil is first fumigated and aerated, or treated with a nematicide before planting. Fertilizing the plants will overcome the foliar symptoms. However, nematodes also will benefit from the increased plant nutrition and be able to increase their numbers. This, then, only worsens the problem over time.



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Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T. R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

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