

# Cold hardiness of Evergreen Cherries

SEVERAL POPULAR CULTIVARS  
MAY BE WELL-SUITED OUTSIDE  
THEIR NATURAL RANGES.

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Mild winters, especially if occurring several years in a row, encourage many home gardeners and nursery professionals to attempt to grow plants that are marginally hardy in a given area. These daring individuals broaden varieties of plants in the gardens and landscapes and often discover that some species and cultivars are more cold hardy than previously thought. Severe winters that inevitably follow, however, frequently lead to bitter disappointments if not financial losses when marginally hardy plants are put to the real test.

Among woody plants it is the broad-leaved evergreens that are so desperately longed for by gardeners in Northern climates. There, native broad-leaved evergreen plants are few, which leads to introductions of many species from more southern and warmer regions. Selecting sheltered locations helps evergreen plants cope with certain elements of winter weather such as desiccating wind, direct sunlight or frozen ground. These can make a difference between a plant's success or failure, but when a sheltered location is not available, it is only the proper selection of a hardy species or cultivar that can offer a long-term solution.

It is widely recognized that some species are hardier than others, but it is not appreciated fully that differences in cold hardiness among cultivars of the same species can be equally as pronounced. This necessitates continued efforts in field testing and evaluating cultivated varieties. Chances of finding significant differences among selections of one species are especially good when this species has a wide geographical or ecological range in its natural habitat.

Comparing hardiness among cultivated varieties was one of the goals of comprehensive shrub trials undertaken by Longwood Gardens Inc., located in Kennett Square in southeastern Pennsylvania. More than 1,100 taxa of broad-leaved evergreen and deciduous shrubs, some of them with borderline hardiness in that part of the country, have been evaluated for the past three years.

One of the groups under study in Longwood trials is cherry-laurel (*Prunus laurocerasus*, also known as *Laurocerasus officinalis*), a long-time favorite cultivated in western Europe since the 16th century, valued primarily for its evergreen, glossy, dark-green foliage. Its leaves are oblong to oblanceolate, typically to 15 centimeters (6 inches) long but in some selections reaching 25 centimeters (10 inches). In April and May, it is adorned with white flowers, to 0.8 centimeters (one-third inch) wide, arranged in axillary and terminal racemes, to 12 centimeters (5 inches) long. Its fruit — drupes — are black-purple, and rather insignificant from an aesthetic point of view. In Russia's Transcaucasia region, however, selections with edible large fruit are cultivated and highly prized.

*P. laurocerasus* has a natural range stretching from south of the Caspian Sea through the western Caucasus Mountains and Transcaucasia, south of the Black Sea,

into the Balkan Mountains in Bulgaria and neighboring Serbia. The species is rarely cultivated and is generally replaced in Western gardens by some 50 or so selected forms. The origin of the large-leaved selections can be traced back to the Caucasus, while the small-leaved selections originated mostly from the Balkans.

The species is thought to be hardy to  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ) or USDA Hardiness Zone 7, making at best only borderline hardy when grown at Longwood Gardens in Zone 6B. Longwood's location has a historic low of  $-25^{\circ}\text{C}$  ( $-14^{\circ}\text{F}$ ). Previously, Michael Dirr and others (see references) reported on winter performance and results of the laboratory freeze tests of only three cultivars — 'Schipkaensis', 'Zabeliana' and 'Otto Luyken'. These studies concluded that while 'Schipkaensis' was the hardiest under landscape conditions, 'Zabeliana' proved to tolerate the lowest freezing temperature under laboratory conditions.

**TESTING 10 POPULAR CULTIVARS.** In our study, in order to determine hardiness levels among cultivated selections of *P. laurocerasus*, 10 cultivars available commercially in the US were evaluated for three years. Two other evergreen species,

*P. caroliniana* and *P. lusitanica*, were added to the study for comparison. Field evaluations were done after the winters of 1998-99, 1999-2000 and 2000-01.

The coldest of the three winters was 2000-01. It had 85 days with minimum temperatures below freezing. In comparison, there were 65 such days during the 1998-99 winter, and only 45 days during the 1999-2000 winter. The lowest temperature recorded during the 2000-01 winter was  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) on Dec. 26, 2000, while during the previous winters it dropped down to  $-12^{\circ}\text{C}$  ( $10^{\circ}\text{F}$ ) on Jan. 4, 1999, and to  $-14^{\circ}\text{C}$  ( $7^{\circ}\text{F}$ ) on Jan. 18, 2000. In both 1998-99 and 2000-01, the coldest period fell on the last week of December and the first two weeks of January, but in 1999-2000 the coldest weather came later and lasted from the middle of January until the middle of February. The extent of winter injury was evaluated in the spring and percentage of foliage scorched was estimated visually.

The 2000-01 field evaluations were supplemented by laboratory freeze tests performed on leaf and stem samples on Jan. 9, 2001. Lowest survival temperatures (LST) were determined by visually evaluating extent of oxidative browning and tissue deterioration after freeze treat-

ment. LST was defined as the lowest temperature at which little or no injury was observed. LST values are compared with 2000-01 field ratings in the table.

All plants survived freezing to at least  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) in the laboratory freeze test. Nevertheless, field observations showed significant winter damage on many cultivars despite the fact that the minimum temperature during the three winters reached  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) only on one occasion. This demonstrates that for evergreen cherries freezing temperature is only one of the factors responsible for winter injury. Plants in Longwood trials were grown in full sun with no protection from wind. Under these conditions they were exposed to stress from desiccation, direct sunlight and rapid temperature fluctuations. All these factors are known to lead to winter injury, especially in broad-leaved evergreen plants.

At the same time, the results of the laboratory freeze tests showed very close correlation with the plants' field performance. Five cultivars that showed no injury or negligible injury in the field — 'Schipkaensis', 'Forest Green', 'Otto Luyken', 'Zabeliana' and 'Compacta' — survived freezing to temperatures as low as  $-27^{\circ}\text{C}$  to  $-30^{\circ}\text{C}$  ( $-17^{\circ}$  to  $-22^{\circ}\text{F}$ ) in the



In Longwood trials, *Prunus laurocerasus* 'Schipkaensis' withstood all three winters without any injury and survived  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ) undamaged in the Jan. 9 laboratory test.

**Winter survival of evergreen cherries at Longwood Gardens. Low temperatures are compared with 2000-01 field ratings.**

Plant	*LST°C (°F)	**Field Rating
<i>P. laurocerasus</i> 'Schipkaensis'	-30 (-22)	0
<i>P. laurocerasus</i> 'Forest Green'	-27 (-17)	0
<i>P. laurocerasus</i> 'Otto Luyken'	-27 (-17)	1
<i>P. laurocerasus</i> 'Zabeliana'	-27 (-17)	1
<i>P. laurocerasus</i> 'Compacta'	-27 (-17)	1
<i>P. laurocerasus</i> 'Parkway'	-21 (-6)	2
<i>P. laurocerasus</i> 'Majestic Jade'	-21 (-6)	2
<i>P. laurocerasus</i> 'Camelliifolia'	-21 (-6)	3
<i>P. laurocerasus</i> 'Marbled White'	-21 (-6)	3
<i>P. laurocerasus</i> 'Mt. Vernon'	-18 (0)	3
<i>P. caroliniana</i>	-21 (-6)	2
<i>P. lusitanica</i>	-21 (-6)	2

\*Lowest Survival Temperature, or lowest temperature at which little or no injury was observed.

\*\*The field rating system is as follows:

- 0 – no injury
- 1 – negligible, sporadic injury to few uppermost leaves, usually injury limited to the leaf tips
- 2 – moderate, less than a third of leaves with leaf blades scorched
- 3 – severe, more than a third of the leaves with leaf blades scorched

laboratory. In contrast, less hardy selections such as 'Parkway', 'Majestic Jade', 'Camelliifolia', 'Marbled White' and 'Mt. Vernon', all significantly to severely damaged in the field, survived freezing only to -18° C to -21° C (0° to -6° F).

Two other species of evergreen cherries, *P. caroliniana* and *P. lusitanica*, proved to be less hardy than the most cold tolerant cultivars of *P. laurocerasus*, such as 'Schipkaensis'. Nevertheless, they performed better than the most cold-sensitive of the cherry-laurels, such as 'Camelliifolia'. Even though results of laboratory freeze tests have to be interpreted with some caution, as plants can be killed at higher temperatures in the field than in the laboratory, they do provide convenient and efficient tools for comparative studies. They also provide growers with information about the minimum temperature below which plants will not survive even under the most favorable conditions.

It is worth noting that on most occasions all of the cherries in this study showed remarkable ability to recover from winter injury. Even plants with extensive defoliation and stem dieback after the winter grew vigorously enough so by midsummer they appeared healthy and attractive again. It was only after the third and severest of the three winters that the three least-hardy selections, 'Camelliifolia', 'Marbled White' and 'Mt. Vernon', did not recover.

*P. laurocerasus* 'Schipkaensis' (photo, page 43): This low-growing selection has wide-spreading branches and narrow, deep-green and slightly glossy leaves. It was found on Shipka Pass near

Kasanlik in Bulgaria, and Späth Nursery in Berlin introduced it in 1889. Considered the most hardy among *P. laurocerasus* selections, it was killed to the ground by -25° C (-13° F) according to a 1943 report from The Arnold Arboretum of Harvard University in Jamaica Plain, MA. In Athens, GA, it showed no injury after -16° C (3° F) on Dec. 25, 1983. Samples collected from the same location were killed by -18° C (0° F) in laboratory tests on Jan. 12, 1989, but survived -21° C (-6° F) on Feb. 15, 1989. In Longwood trials it withstood all three winters without any injury and survived -30° C (-22° F) undamaged in the Jan. 9 laboratory test.

*P. laurocerasus* 'Forest Green': It is a low-growing form with a broad-spreading habit and large, glossy, very dark-green leaves. It originated as a chance seedling in Bear Garden Nurseries in Silver Spring, MD. In Longwood trials uppermost leaves were slightly scorched after the 1998-99 winter, and we observed only negligible sporadic injury to a few leaves after the following two winters. It withstood -27° C (-17° F) in the laboratory freeze test.

*P. laurocerasus* 'Otto Luyken' (photo, page 46): This compact, spreading shrub with narrow, glossy, dark-green leaves originated in 1940 as a seedling at Hesse Nursery in Weener, Germany. It died in field trials in Maine (Zone 4A). It was severely injured after -32° C (-25° F) on Dec. 25, 1983, in Cincinnati. Some plants resprouted there, but those in exposed sites died to the ground. Samples collected from plants growing in Athens, GA, were killed by -18° C (0° F) in labora-



*Prunus laurocerasus* 'Otto Luyken' showed some scorching limited to the uppermost leaves after all three winters, although no stem defoliation or dieback was observed.



*Prunus laurocerasus* 'Compacta' showed only slight scorching of its leaf edges after the 1998-99 winter, no cold damage after the 1999-2000 winter and negligible leaf scorch after  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) during the 2000-01 winter.

tory tests on Jan. 12, 1989, but survived  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) on Feb. 15, 1989. In Longwood trials it showed some scorching limited to the uppermost leaves after all three winters. No stem defoliation or dieback was observed. It tolerated freezing to  $-27^{\circ}\text{C}$  ( $-17^{\circ}\text{F}$ ) in the laboratory test.

*P. laurocerasus* 'Zabeliana': It is a low-growing, spreading form with narrow, very glossy, light-green leaves. The Späth Nursery in Berlin, Germany, introduced it from Bulgaria in 1898. In Athens, GA, it showed no injury after  $-16^{\circ}\text{C}$  ( $3^{\circ}\text{F}$ ) on Dec. 25, 1983. Samples collected from plants in the same location were killed by  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) in laboratory tests on Jan. 12, 1989, but survived  $-24^{\circ}\text{C}$  ( $-11^{\circ}\text{F}$ ) on Feb. 15, 1989. In Boston it developed some leaf browning after a  $-25^{\circ}\text{C}$  ( $-14^{\circ}\text{F}$ ) freeze in February. In Longwood trials it went through the 1998-99 winter unharmed. During the 1999-2000 and 2000-01 winters it suffered only negligible marginal scorching affecting less than 5 percent of the uppermost leaves. It withstood freezing to  $-27^{\circ}\text{C}$  ( $-17^{\circ}\text{F}$ ) in the laboratory.

*P. laurocerasus* 'Compacta' (also known as 'Schipkaensis Compacta'; photo, left): It

is a low-growing selection with a broad, upright habit, ascending branches and dull, dark-green leaves. The W. Klenert Nursery in Graz, Austria, introduced it in 1914. In Longwood trials it showed only slight scorching of its leaf edges after the 1998-99 winter, no cold damage after the 1999-2000 winter and negligible leaf scorch after  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) during the 2000-01 winter. It survived freezing to  $-27^{\circ}\text{C}$  ( $-17^{\circ}\text{F}$ ) in the laboratory.

*P. laurocerasus* 'Parkway': It is an upright, tall shrub with very large, glossy, dark-green leaves. It was introduced by Woodlanders Nursery in Aiken, SC. Woodlanders propagated it from an old, unidentified specimen growing in the Aiken Park. It is perhaps the same cultivar as 'Magnoliifolia'. In Longwood trials it showed winter damage affecting between 10 percent to 20 percent of its leaves after all three winters. Scorching and defoliation were limited to the uppermost sections of the stems. No significant stem dieback was observed. It tolerated  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) in the laboratory test.

*P. laurocerasus* 'Majestic Jade': Michael Dirr selected this dense, upright plant with lustrous, dark-green leaves in the mid-1980s at the University of Georgia from among seedlings of 'Otto Luyken'. It was planted in the trials the spring of 1999; therefore, no data were available for the 1998-99 winter. It suffered moderate defoliation and dieback after the 1999-2000 winter. After the 2000-01 winter, up to a third of the leaves developed marginal scorch. It withstood freezing to  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) in the laboratory.

*P. laurocerasus* 'Camelliifolia': Tall and upright, it bears glossy, twisted leaves and was introduced in 1901. In Longwood trials as much as half of the leaves were scorched and desiccated, while the upper stems mostly defoliated after exposure to  $-18^{\circ}\text{C}$ . It was one of the most severely damaged cultivars after all three winters. It tolerated  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) in the laboratory freeze test.

*P. laurocerasus* 'Marbled White' (also known as 'Castlewellan' and 'Marbled Dragon'): It is a broadly conical selection with leaves marbled light green and white. It was among the most severely damaged cultivars. Leaves were scorched and stems defoliated, especially in the upper portion of the plant, after all three winters. Noticeable stem dieback developed as the result of freeze injury. After the 2000-01 winter, nearly half the leaves were damaged. It survived freezing to  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) in the laboratory.

*P. laurocerasus* 'Mt. Vernon': It is a slow-growing, spreading form with large leaves typical of the species. Wells Nur-

sery in Mount Vernon, WA, introduced it. Leaves showed severe injury after all three winters, with as much as half of them scorched after the 2000-01 winter. Upper stems were entirely defoliated, and some developed dieback. Only the lowest leaves near the ground remained on the plants. It tolerated freezing to only  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) in the laboratory.

*P. caroliniana*: Native to the southeastern US, this large shrub grows up to 12 meters (40 feet) tall and has lustrous, bright-green leaves. It is recommended for growing in Zone 7. In Longwood trials it showed extensive scorching on up to one-third of its leaves after all three winters. Some stem dieback was also observed on the uppermost branches. In the laboratory test it survived freezing to  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ).

*P. lusitanica*: Native to the Iberian Peninsula, it grows as a tree up to 20 meters (60 feet) high, while in cultivation it develops more often as a dense shrub up to 4 meters (12 feet) high. Its leaves are a dull, dark-green. Red stems and leaf petioles, especially bright on new growth, provide additional interest. It is recommended for growing in Zone 7, but successful plants have been reported from Zone 6. It is sometimes considered hardier than *P. laurocerasus*. In Longwood trials, moderate injury developed after all three winters with up to a third of the leaves scorched, primarily in the upper portion of the plant. It tolerated freezing to  $-21^{\circ}\text{C}$  ( $-6^{\circ}\text{F}$ ) in the laboratory.

Despite remarkable ability of evergreen cherries to recover repeatedly from winter injury, only the hardiest selections of *P. laurocerasus* ('Schipkaensis', 'Forest Green', 'Otto Luyken', 'Zabeliana' and 'Compacta') can be recommended for growing under typical landscape conditions in southeastern Pennsylvania. These cultivars not only remain attractive year-round and pass unharmed through an average winter, but freezing tests results indicate they have the potential to survive the severest winters encountered in the region, thus promising many years of enjoyment for those who grow them.

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#### REFERENCES

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