

# PACIFIC YEW

COMMON NAME

## *Taxus brevifolia*

SCIENTIFIC NAME

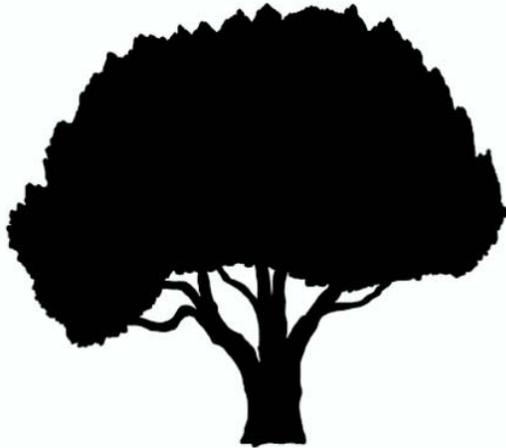


Photo Credit: Edward S. Ayensu, USDA-NRCS PLANTS Database

### Importance

Pacific yew is one of the great success stories of ethnobotanical research. Also known as the western yew or Montana yew, this small, shrubby tree was used extensively by native American tribes in the Pacific Northwest. The wood was used for canoe paddles, war clubs, any number of household items, gambling tokens, ceremonial objects and harpoons, fish spears, fish clubs, and dip net frames along the coast. It was also valued as wedges for splitting cedar (in the Hesquiat, Saechelt, Suquamish and Nootka languages the name of the tree means wedge-plant) and was highly prized for making bows (its Haida name means bow-plant).

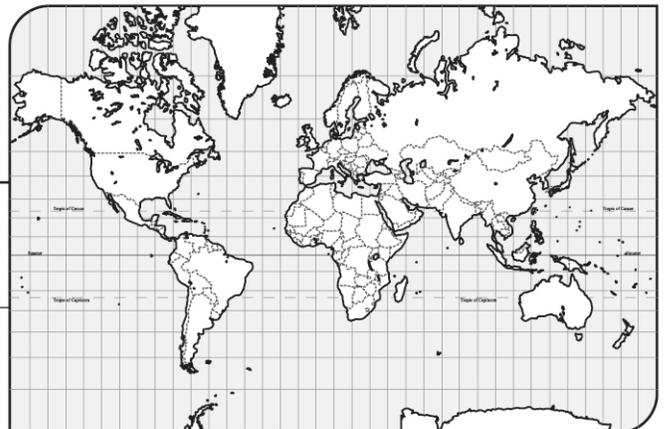
*Taxus brevifolia* was also widely used in traditional medicine. The tree was imbued with almost magical properties, and infusions of the leaves and bark were drunk for strength by a wide variety of tribes. The Swinomish believed that even rubbing the limbs with the boughs from the tree would bring strength.

### Yew Family (*Taxaceae*)

FAMILY

### Near Threatened

RED LIST CATEGORY



In western culture, this plant had little commercial or economic value – settlers in the Pacific Northwest considered it of little use and used it mostly for fenceposts, firewood, and tool handles. In the 1960s, this all changed. During the 1950s and 60s, the newly formed National Cancer Institute contracted with the USDA to find samples of plants that showed potential for fighting cancer. After testing 15,000 plants, five species showed further promise.

One of these species, *T. brevifolia*, showed a broad spectrum of anti-cancer activities when it was analyzed in 1962. Traditional medicine had useful information for modern medicine - two years later, scientists had isolated a compound from the tree bark that was the source of this plant's anti-cancer properties. This compound, named "taxol," showed great promise as a new cancer drug, but was so chemically complicated that it had to be obtained from natural sources rather than being synthesized. In order to make more taxol for the extensive studies required to understand the use of the drug and get it approved, wild trees had to be harvested for their bark.

This compound became the basis for the chemotherapy drug paclitaxel, one of the best-selling cancer drugs of all time. While the drug was originally approved for use as a treatment for ovarian cancer, the pharmaceutical company manufacturing the drug reported that ongoing research was showing its efficacy in other areas such as cancers of the lung, breast, bladder, prostate, esophagus, head and neck, cervix, and endometrium and also Kaposi's sarcoma. Due to limited supply of slow growing Pacific yew, taxol also became one of the most expensive drugs on the market. However,

recent advances in synthesizing the drug from other species of yew have reduced the burden on Pacific yew populations. Today, this species is once again highly valued for its medicinal properties, though that value does still place the tree under conservation concern.

## Description

**Form:** A small understory evergreen tree. The growth form is indistinct – it can be shrubby, but can vary greatly depending on growing conditions. While the tree can reach 50 feet (15 m) tall and 2 feet (60 cm) in diameter, it is usually much smaller, with fluted and asymmetrical trunks. Pacific yew is very slow growing but can be an extremely long-lived tree.

**Leaf:** Evergreen needles, single, spirally arranged on a single plane. The needles are 1 inch (2 cm) long, yellow-green to dark green above and paler below (but not white). The tips of the needles are pointed but not sharp, and the leaf margins tend to roll under. Each needle has a distinct petiole that parallels the twig for a short distance.

**Flower:** Pacific yew is dioecious, with male and female flowers on separate plants. The male flowers are small, round, and yellow and are borne on the undersides of the leaves, and the female flowers are solitary.

**Fruit:** A round, fleshy, orange-red aril – a fruit shaped like a berry, with pulpy flesh surrounding a hard central seed with no seed coat. This fruit is usually about 0.25 inches (0.63 cm) long containing one hard seed that is exposed at the end.

**Bark & Twigs:** The bark is always thin (about 0.25 inches, 0.63 cm), reddish brown, and scaly with reddish purple inner bark. The

twigs are round and slender, remaining green for many years.

## Habitat and Ecology

*T. brevifolia* occurs in northwestern North America, from northwest California north to southern Alaska and east to Montana. It is an understory tree of Pacific Northwest forests, found in light to deep shade. Pacific yew is mostly found in somewhat moist forests, especially along streams and on slopes. It is not uncommon within its main range of distribution, with distribution patterns ranging from scattered to dense patches. Thousands of occurrences are estimated to exist.

As an understory tree of coniferous and mixed coniferous forests, Pacific yew is extremely shade-tolerant. As a young tree, *T. brevifolia* apparently requires shade for establishment, but older trees are able to adapt to overstory removal. Moisture requirements are fairly high and, in drier areas, it is limited to streamsides, seepsides, and shady, north-facing slope bottoms and tolerates a wide range of temperature conditions. Elevations range from sea level to 7800 feet (2440 m) at the southern end of its range, in the Sierra Nevada.

While this species is widely distributed in its range, Pacific yew is also slow-growing, does not reproduce rapidly, and is strictly limited to western North America. Although it is somewhat resistant to minor disturbances, harvesting or logging can fairly easily eliminate this tree from a given area.

## Threats

Logging activity, occurring throughout much of its range, is the most significant current

threat to this species. In the past, there was concern that it could be threatened by harvest of its bark for extraction of the anticarcinogen taxol, and native populations have been under considerable pressure from the scale of exploitation of the bark by pharmaceutical companies. This tree is currently declining in numbers and could soon be at risk for extinction if this trend continues.

However, the threat to the tree from taxol production has been greatly reduced in recent years. Appropriate ways of synthesizing taxol from the leaves of Eurasian yew trees, mainly *T. baccata* and *T. wallichiana* have been developed, and most taxol supplied today is synthesized this way. In addition, plantations of this tree are now being created for the purpose of harvesting taxol. So harvest for this purpose is does not appear to be as significant a future threat at this time. Nonetheless, the wild populations of this tree should be closely watched, particularly as the region faces increased pressure from logging, wildfires, and climate change.

## Conservation Action

Since Paclitxel is now semi-synthesized from other yews, and is beginning to be obtained from plantation sources, some of the pressure on Pacific yews has already been reduced. However, there are several ways you can still help! The species occurs in many national parks in the northwest – you can help protect this tree, and other trees by visiting America’s national parks, which help preserve and protect trees, including those whose life-changing possibilities have not yet been discovered. Recycling, and reducing the use of paper and other forest products will also help reduce logging pressure on the forests that form the habitat for this important species.

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