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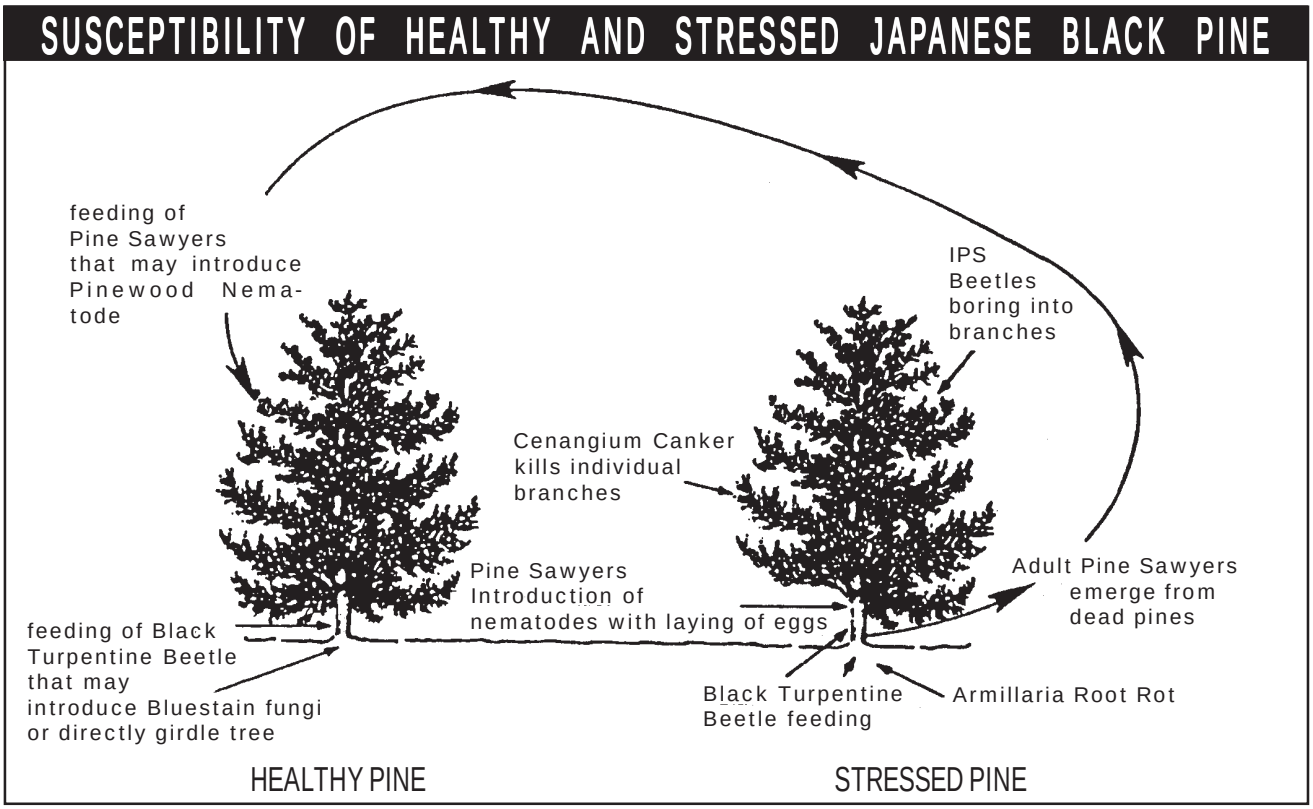
The Japanese Black Pine — What's Happening?



Since the 1940's, the Japanese black pine, *Pinus thunbergii*, has been one of the most widely planted trees in seashore land- scapes on Long Island. The evergreen tree has been valued for its ability to withstand salt spray and its usefulness as a windbreak and/or screen. Although it seems like a natural feature of the landscape, the Japanese black pine is actually an exotic ornamental here, having been introduced from its native Japan and Korea.

For about the last 15 years, Japanese black pines on Long Island have been dying in relatively large numbers, particularly on the north and south forks. The trees most susceptible to problems seem to be 15 to 20 or more years old. Initially, the trees that were most often seen dying were those exposed to the harshest growing conditions. Usually, they received little maintenance and were growing in very sandy soils, often exposed to the rigors of a seashore location. There seemed to be a correlation between trees growing in stressful conditions and those that were dying.

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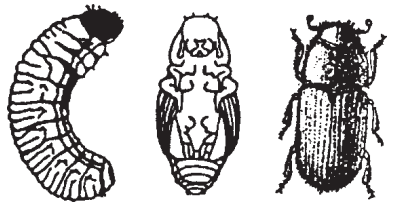
Black Turpentine Beetle



Life stages of the black turpentine beetle. Actual size is approximately one-quarter inch.

In the late 1970's, the black turpentine beetle, *Dendroctonus terebrans*, was discovered attacking Japanese black pines on the south fork. At that time, personnel from Cornell Cooperative Extension of Suffolk County and the Long Island Horticultural Research Laboratory in Riverhead developed information and control suggestions for this pest. In more recent years, these beetles have been frequently observed in Japanese black pine on the north fork and further west, into Nassau County. These insects have also been reported on *Pinus rigida*, the native pitch pine, in a few isolated cases.

The boring of the black turpentine beetles causes resin to flow, harden and produce the characteristic pitch tubes, which are usually seen on the lower 4 to 5 feet of the trunk. The larvae, which feed on the inner bark, may completely girdle the tree. Although pitch tubes are a good indication of black turpentine beetle attack, they will not be apparent if the beetles have attacked below the soil line, as is occasionally the case. Recently, the beetles were found in the major roots of a Japanese black pine on the SUNY at Stony Brook campus, even though no pitch tubes were visible on the main trunk above ground.

Often a blue-stain fungus, *Leptographium sp.*, is carried by the beetles and introduced into the tree. The killing of cambium by this fungus often magnifies the injury from the black turpentine beetle.

Until recently, these two factors have been looked upon as the primary cause for the death of 15-to-20-year old Japanese black pine by the seashore. Affected trees turned a lighter green color, eventually turned brown and died. This often took place within a few months.

Integrated Pest Management (IPM) Considerations

IPM is a common sense approach to pest control and plant care. It employs a number of measures to prevent, control or reduce plant problems. These include using resistant plant varieties, proper plant selection and placement, good aftercare and biological and/or mechanical controls.

As a last resort, after all other remedies have been explored, a pesticide* that is least toxic to people and natural predators, can be considered. Prior to using any pesticides, plants should always be monitored for the degree of infestation and a sensible control measure considered.

** A pesticide is a substance that kills, or attempts to kill, a particular pest, e.g.* ***insect****icide,* ***fung****icide,* ***herb****icide, etc.*

Management Options

Trees smaller than Christmas trees are less likely attacked. Japanese black pine, pitch pine, Scots and other pines are commonly affected, as well as red spruce. Most damage is to lower 18 inches of trunk. Remove and destroy newly cut trees, including stumps and buttress roots. Although healthy trees are sometimes affected, by minimizing drought and other stresses, you will decrease susceptibility.

Chemical pesticides may be available. If you choose to use a chemical pesticide, contact your local Cooperative Extension office for specific recommendations. In mid-April and again in mid-May thoroughly drench lower 6 feet of trunk and buttress roots with forceful spray. Reapply in summer if adults are still present.

Pinewood Nematode

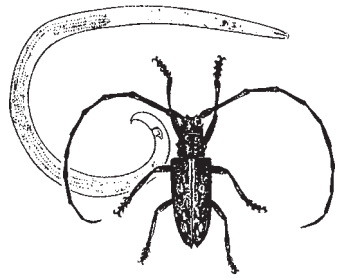
The pinewood nematode, which is thought to be native to this country, has recently been identified as another major factor in the death of the Japanese black pine on long Island. Samples of pine taken from New Suffolk, Springs (East Hampton), Muttontown, Jones Beach and Orient State Park have been found to contain this nematode.

Pinewood nematodes are microscopically tiny unsegmented worms that are carried to healthy pines by an insect vector, a long-horned beetle called a pine sawyer. While the beetle feeds on branches at the top of the tree, nematodes gain entry through the feeding wounds, multiply, and feed within the resin canals of the pine. The population buildup of the parasitic nematodes within the tree results in yellowing and death of foliage. Ultimately, the entire tree succumbs. The pine sawyers are attracted to dying (including nematode-killed) trees to lay their eggs. Two years after egg-laying, adult beetles bore out from the dead trunks, leaving 1/4-inch round holes. Their bodies may be contaminated with pinewood nematodes, which will hasten the demise of healthy pines that the beetles feed on. Note that the presence of pinewood nematodes in a dying tree does not necessarily mean that they caused its death; pine sawyers also introduce nematodes when they lay eggs in trees that are already dying from some other agent.

The New York State Department of Environmental Conservation has now stopped growing and shipping Japanese black pine seedlings from the state nursery, largely due to the trees' vulnerability to pinewood nematode. At this point, they are offering no plant substitute with the characteristics or adaptability of the Japanese black pine. It has been suggested that white pine, *Pinus strobus*, or European larch, *Larix decidua*, be shipped to Long Island instead. The white pine, however, does not tolerate salt in soil or salt spray and the larch has been reported susceptible to pinewood nematode.

The real question now is, are pinewood nematodes the real cause of death in the majority of Japanese black pine on Long Island? This is important because there are no know controls for the nematode. On the other hand, arborists have been able to reduce losses of the Japanese black pine to black turpentine beetles with a combination of timely insecticide sprays and increased maintenance, including quick removal of dying trees and their stumps. Successful control is most likely when an infestation is identified early and the blue-stain fungus has not been introduced.

We went to Orient State Park to look at the Japanese black pine situation there. On the majority of pines that had been cut down or were showing symptoms of decline, pitch tubes from the black turpentine beetles were found at the trunk base. Some of the tubes were freshly made and some were from previous years. At the entrance to the park, many large trees showing no symptoms are next to trees with fresh pitch tubes. They are showing the classic symptoms of decline and/or dying that have been associated with black turpentine beetle and/or blue-stain fungus. Other trees in the park that show no pitch tubes above ground do have branch-by-branch foliar yellowing symptoms that are typical of pinewood nematode, which has been found in several pine samples taken from the park. In the Orient State Park site, it appears that pinewood nematode and black turpentine beetle are sharing responsibility for death of pines. It would be difficult to determine which has the more significant role.



The pinewood nematode, Bursaphelenchus xylophilus, and one of its insect vectors, Monochamus carolinensis. (The male nematode shown is 0.73 mm long, whereas the insect is over 1 1/4" long.)

Drawing courtesy of Pine Will Disease, Bul. SR282, University of Missouri - Columbia.

Pine Vole

Although probably not the most common cause of Japanese black pine death on Long Island, injury from pine voles, *Microtus pinetorum*, has also been seen in many landscapes. These rodents feed on the bark of roots and the lower trunk of trees. The injury can weaken and may, in some cases, cause the death of the tree. Deep mulches or needle litter under trees can hide the rodents' network of tunnels and exit/entering holes.

Cenangium Canker

In some sites, especially on Shelter Island and Amagansett on the south shore of Long Island, the Japanese black pine has succumbed to a fungus disease called Cenangium canker. The opportunistic fungus enters branches through wounds and can cause a significant amount of dieback. Stresses that may make a tree susceptible to infection include drought, wounding, extremely cold weather or hurricane injury. Infection takes place any time between mid-July and mid-September. Clusters of small, brown, cup-like fruiting structures can be seen on branches, in the scars where needle bundles were attached years before.

Conclusion

It is obviously wise to look for acceptable replacements for the Japanese black pine for Long Island's seashore landscapes. Eventual replacement cost should be anticipated, as older trees appear to be more susceptible to known pests. Proper fertilization could help trees to maintain good health. Avoid unnecessary pruning — let the trees grow to their natural form. Unless a true seashore condition exists, it would be wiser to use other plants that will accomplish the same or similar results. Another choice could be *Juniperus virginiana*, the eastern red cedar. This tree is native to Long Island and is often found growing in the sandy soils near the seashore. If a tall plant is not needed in a seashore landscape, consider some of the smaller plants that grow well in these sites. Some of these are *Myrica pennsylvanica*, the bayberry; *Prunus maritima*, the beach plum; *Rosa rugosa*; or *Ilex glabra*, the inkberry. Also, encourage native plants to develop in these sensitive areas. They are naturally adapted to these particular sites.

In conclusion, landscape designers and architects, horticulturists, and the homeowner are all responsible for seeing that the Japanese black pine is not overused in landscapes that are not in seashore locations.

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