

# EXTENSION NOTES



## EASTERN HEMLOCK

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Eastern hemlock is Ontario's most graceful evergreen. Slow growing and long living, the hemlock's conical shape and heavy foliage make it a prized ornamental tree, as well as good cover for wildlife.

This Extension Note provides information on how to identify and grow eastern hemlock, the uses of hemlock and factors to consider when managing a hemlock stand to enhance wildlife habitat.

### HISTORICAL AND CURRENT USES OF HEMLOCK

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Aboriginal people in North America used the leafy twigs of eastern hemlock to make tea and for steam baths. Tea from the inner bark was prescribed for colds, fevers, diarrhoea, stomach troubles and scurvy. The bark was also used in poultices to slow bleeding.

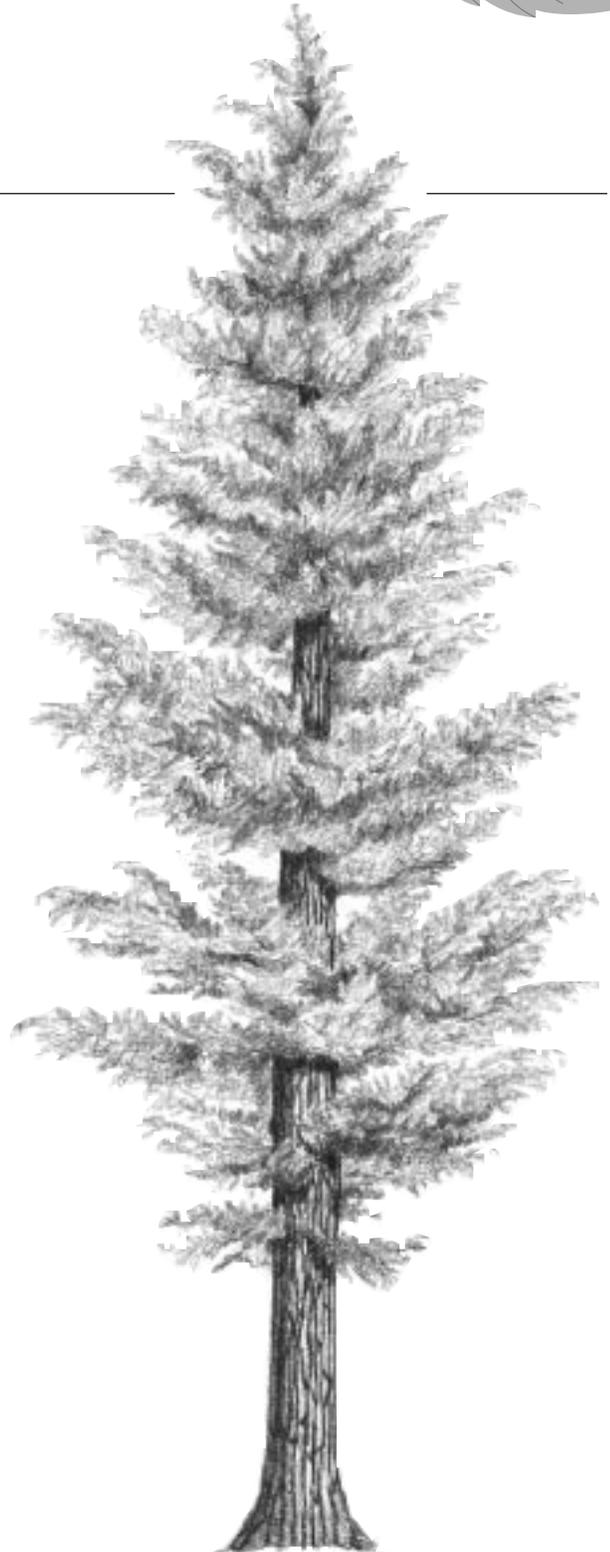
The bark of eastern hemlock is rich in tannin and was once one of the main commercial sources for the leather industry. Unfortunately, trees were often stripped of their bark and left to rot.

The wood is brittle, splinters easily and is knotty, which lowers its value as lumber. Hemlock is used for coarse lumber, rough dimension stock, general construction, boxes, crates, railway ties and pulp.

Eastern hemlock and its many horticultural varieties are frequently used in landscaping. Young trees are easily trimmed and are often used as hedges. Hemlock is popular because of its relative freedom from disease and insects and good foliage color.

Pure hemlock stands produce a dense canopy, limiting snow accumulation on the forest floor. White-tailed deer often yard in hemlock groves during bad winters and browse on hemlock needles, one of their preferred foods. Many other species of wildlife, such as ruffed grouse and wild turkey, also benefit from the excellent habitat that a dense stand of hemlock provides.

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## IDENTIFYING EASTERN HEMLOCK

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### TREE SHAPE

Young hemlock is one of Ontario's most beautiful conifers. Its slender branches spread horizontally from the trunk and often sweep toward the ground. The leader, or terminal shoot, is long and slender, often curving away from the prevailing wind in a drooping fashion. The heavy foliage of the branches gives hemlock a cone shape. The crown of older trees is generally ragged, because dead branches often remain on the trunk.

Eastern hemlock can take 250 to 300 years to reach maturity and can live for 800 years or more. Mature trees reach heights of 18 to 21 metres and diameters of 60 to 90 centimetres.

### LEAVES

The needle-like leaves are short, from one to 1.5 centimetres long. Flat and narrow with slender stalks, needles are also slightly notched or rounded at the tip. They are dark green above and light green below with two white parallel lines. Needles are attached around a branchlet by a stem and remain on the twig for three years or more.

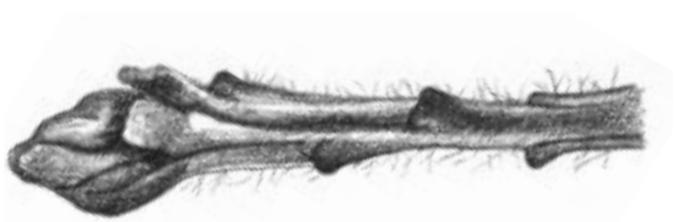


### TWIGS

Hemlock twigs are slender, yellowish-brown and hairy when young. Older twigs are reddish-brown and smooth.

### BUDS

The brownish buds are small, about 1.5 millimetres long, and blunt.

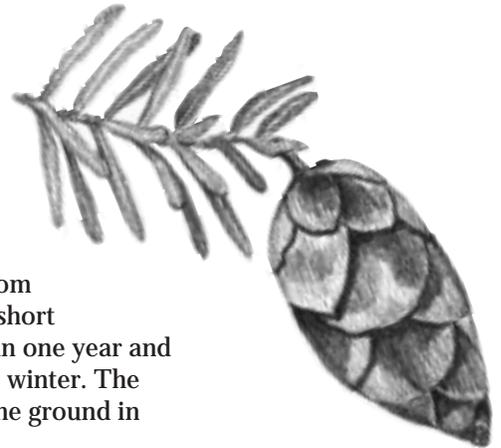


### BARK

Hemlock bark is cinnamon-red to brown in color. On young trees the bark is covered with fine scales. On mature trees the bark is deeply furrowed and divided by broad, flat-topped ridges. The inner bark is strikingly cinnamon-red or purplish, while the outer bark has purplish streaks when freshly cut.

### CONES

Newly developed cones are oval in shape and green to purple in color. Mature cones look more reddish-brown and are 1.5 to two centimetres long. Cones hang singly from the ends of twigs on short stalks. They mature in one year and release their seeds in winter. The empty cones fall to the ground in the spring.



## WHERE EASTERN HEMLOCK GROWS BEST

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Eastern hemlock was commonly found in the Great Lakes/St. Lawrence and the Acadian forest regions. However, this species regenerates slowly and commercial cutting has greatly reduced the numbers of hemlock trees in these areas.

### SOIL

Hemlock trees grow best in moist to very moist soils with good drainage. Shallow loams and silt loams are preferred but sandy soils mixed with humus are also suitable.

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### STAND COMPOSITION

Hemlocks will grow in pure stands but are more often found with a mixture of other tree species. They are commonly found with yellow birch. Other species found with hemlocks include eastern white pine, red spruce, white spruce, sugar maple and beech.

### STAND LOCATION

Hemlock is usually found on moist, cool, northern slopes, on the borders of streams and near swampy areas.

### SHADE OR SUNLIGHT?

Hemlock is among the most shade tolerant of trees. It can grow successfully in the shade of other trees but its growth rate is extremely slow.

## HOW TO GROW AND CARE FOR EASTERN HEMLOCK

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How you manage your hemlock stand depends on your goals. Hemlock has an uncommon ability to hold nails and spikes and, in the past, was widely used for railway ties and other rough grade construction uses. However, landowners rarely manage woodlots for hemlock because the wood is of limited value for lumber or firewood.

Today, stands dominated by hemlock are often managed to enhance their value to wildlife. Leaving 10 to 30 percent of a stand as dense hemlock will provide a shelter for deer in harsh winters. Selectively cutting hardwoods from the remaining 70 to 90 per cent of the stand will open up the forest, allowing natural regeneration of hemlock and other species and renewal of the food supply that wildlife depend on.

For assistance in preparing a forest management plan for your woodlot, contact an independent forestry consultant or the Ministry of Natural Resources.

While not impossible, it is difficult to establish a new hemlock stand from seedlings. Hemlock trees are hard to grow in nurseries and from seedlings in the field. Hemlock seedlings require a moist, cool mixture of mineral and organic soil to become established. They are extremely tolerant of shade and will grow vigorously with as little as 20 percent sunlight. Full sunlight is harmful to seedlings.

## KEEPING HEMLOCK HEALTHY

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With their shallow, wide spreading roots, hemlocks are highly susceptible to drought and prone to uprooting by wind. Young trees are also vulnerable to ground fire. The thick bark of older trees allows them to survive light, surface forest fires. Fires that burn deeper than the surface litter can damage the tree's shallow roots. To protect against wind and drought, do not open up a stand too much by over harvesting.

Because they require stable amounts of moisture, seedlings are also sensitive to high temperatures and dry soil.

The easiest way to establish a hemlock stand is to manage an existing woodlot in ways that nurture mature hemlock trees and allow hemlock to regenerate naturally.

### MANAGING AN EXISTING STAND

To maintain a hemlock stand over a long period of time, remove only the largest hardwood trees so that you do not significantly reduce the overhead canopy in the stand. By selecting hardwood trees for removal, you can help the hemlock come to dominate over time.

### REGENERATING HEMLOCK NATURALLY

Hemlocks will regenerate in the shade of a heavy forest canopy. However, growth is slow until a change in the canopy permits more light to reach young trees. A shelterwood cutting system, which removes mature trees in two or three separate cuts, is an effective method for regenerating hemlock because it promotes seed germination and seedling growth without significantly reducing soil moisture. To help hemlocks regenerate, the forest soil should be mechanically turned over and all competing hardwoods should be removed prior to, or immediately after, the cutting operations.

Hemlocks can be threatened by porcupine and snowshoe hares. Porcupines eat the bark, often injuring mature trees and killing young trees. Snowshoe hares can strip the bark off the base of younger trees. While there is little you can do to stop porcupine damage, you can help to protect young hemlock trees from hares by removing the forest understorey and grasses around the trees. This reduces shelter, making hares more vulnerable to predators.

Hemlocks are susceptible to the following insect pests and fungal infection:

#### HEMLOCK LOOPER (*Lambdina fiscellaria*)

This insect feeds on old and new foliage, devouring part of the needle after which the remainder turns brown. The larvae are light brown on the sides and dark brown on the back.

Hemlock looper is controlled naturally by weather, parasites, disease, starvation and predators. In extreme cases, a contact or stomach insecticide may be necessary.

#### HEMLOCK BORER (*Melanophila fulvoguttata*)

This insect usually attacks weakened trees. The larvae are legless grubs with a widened thorax. Adults are flattened, metallic black beetles with three small white spots on each wing cover. Hemlock borers leave woodpecker-like holes in the bark, filled with dark excrement. The tree's shoot tips turn yellow.

Hemlock borers are controlled naturally by weather, parasites, disease, starvation and predators. In extreme cases, a contact or stomach insecticide may be necessary.

#### ROOT ROT (*Armillaria mellea*)

This fungal infection is found at the base of living trees or infected stumps. Spores are produced which infect other trees when released into the air. The infection causes yellow foliage, stunted growth and then death.

Root rot can be controlled by covering exposed stump surfaces with dry Borax powder. Heavily infested areas should be clear cut.

The best way to keep your hemlocks healthy is to manage your stand in ways that reduce stress. Monitor the health of forests in your area and watch for insect pests in your stand. Try not to cut or prune trees when they are subject to the following stresses caused by extreme weather or biological factors, or to compound these stresses by poor management practices.

#### STRESSES CAUSED BY WEATHER

- drought
- wind
- sunscald

#### BIOLOGICAL STRESSES

- leaf loss from insects
- wildlife damage
- root rot
- seedling suffocation under hardwood leaf fall during first five years of growth

#### STRESSES CAUSED BY POOR MANAGEMENT

- livestock grazing
- thinning which exposes stands to wind damage
- thinning during periods of drought or insect infestations
- careless use of machinery

Livestock grazing is particularly stressful for hemlock and other species. Livestock trample the roots of mature trees and compact forest soil, resulting in reduced levels of natural regeneration.

#### Further reading:

- Bruce, D.S., C.J. Heeney. 1974. *A Silvicultural Guide to the Hard Maple, Yellow Birch and Hemlock Working Group in Ontario*. Ontario Ministry of Natural Resources.
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- Rose, A.H., O.H. Lindquist. 1985. *Insects of Eastern Spruces, Fir and Hemlock*. Canada: Supply and Services Canada.
- Strickland, D. 1987. *Trees of Algonquin Provincial Park*. Whitney: The Friends of Algonquin Park in co-operation with Ontario Ministry of Natural Resources.
- Ontario Institute for Studies in Education in Co-operation with the Ontario Ministry of Natural Resources. Woodlot management material to accompany *The Forests or the Trees*.

