

# EXTENSION NOTES



## RED OAK

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Red oak is one of Ontario's largest and most valuable trees for wood products. Also known as northern red oak, its abundant and nutritious acorns are an important food for wildlife. It is also prized as an ornamental tree for landscaping because of its symmetrical shape.

This Extension Note provides information on how to identify and grow red oak trees, the uses of red oaks and methods for managing red oaks for wood and wildlife habitat.

### THE USES OF RED OAK

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Red oak is used for flooring, furniture, millwork, railway ties, tool handles, fence posts, plywood, veneer and barrels for storing dry goods. The wood is hard, heavy, strong and pink to reddish-brown. Viewed in cross-section, it has clearly defined annual rings, which are separated by bands of large vessels.

Red oak is extremely important as a food source for wildlife. Deer feed heavily on acorns that have fallen to the forest floor. Acorns may also be a crucial part of the diet of bears as they fatten up before hibernation. Turkeys, ducks, grouse, quails, pheasants, songbirds, blue jays, titmice, woodpeckers, raccoons, chipmunks, squirrels and other wildlife also rely on red oak acorns for food.

### HOW TO IDENTIFY RED OAK

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As with all species of oaks, the characteristics of red oak trees are highly variable, particularly the leaves and fruits which have a great range in shapes. That's why it's best to rely on a number of characteristics when identifying this species.

#### TREE SHAPE

Red oak trees growing in the open generally develop short, sturdy trunks with large branches that support wide, rounded crowns. Trees growing in forests have straight trunks with branches that begin at the midpoints and rise to form narrow, rounded crowns.



**TREE SIZE**

Mature trees reach heights of 18 to 25 metres, with diameters of 30 to 90 centimetres.

**LEAVES**

Red oak leaves are arranged alternately (not directly opposite each other) on the twigs. They are lustrous green on both sides, 12 to 18 centimetres long and seven to 11 centimetres wide. The leaves are divided into seven to 11 lobes. The lobes have bristles on the tips and are evenly spaced and sharply pointed.

**TWIGS**

Twigs are stout, reddish-brown and hairless.

**BUDS**

The buds are about six millimetres long, reddish-brown and smooth except for a few brownish hairs at the tips. They have sharp points.

**BARK**

On young trees, the bark is smooth and slate grey. The bark of mature red oak trees is grooved by shallow furrows that divides into long flat ridges.

**FRUIT**

Red oak trees produce acorns that are two to three centimetres long. About one-third of the acorn is enclosed by a shallow cup, which is covered by closely fitting, reddish-brown scales.



The acorns mature in two years and stay on the tree during the winter. This feature distinguishes it from white oak, which loses its acorns before winter.

**WHERE RED OAK GROWS BEST**

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Red oak is a common species in the Deciduous, Great Lakes-St. Lawrence and Acadian Forest regions. In Ontario, it grows primarily along the north shore of Lake Huron and in the areas south of Sudbury.

**SOIL**

Optimal growing conditions for red oak trees are fresh sites with fine, deep soils that have a loam or silt-loam texture. Porous, sandy or gravelly soils with good drainage are also suitable.

**SHADE OR SUNLIGHT?**

Red oaks can tolerate shade as seedlings, but as they reach their second or third year they begin to need sunlight for optimal growth.

**STAND COMPOSITION**

Toward the northern limit of its range, red oak is often found in pure stands along rocky ridge tops. Further south, it is commonly found with white pine, large tooth aspen, sugar maple, basswood and many other species.

**STAND LOCATION**

Red oak trees most frequently grow on north- and east-facing lower and middle slopes.

## HOW TO GROW AND CARE FOR RED OAK

Red oak stands can be managed for wood products and to enhance wildlife habitat. If you have a large woodlot, a forest management plan will help you get the greatest benefit from your property. Assistance with preparing a plan is available from independent forestry consultants and the Ministry of Natural Resources.

### REGENERATING RED OAK STANDS

A modified shelterwood system is a useful strategy for regenerating red oak in woodlots. This method enhances natural regeneration of red oaks under the shade of mature trees and involves the selective cutting of mature trees to expose the seedlings to more light.

The shelterwood system involves three kinds of cuts, beginning with a preparation cut that encourages seed production, removes undesirable trees and promotes crown development in the remaining trees.

The second cut is called the seed cut. It removes trees that might compete with the seedlings for nutrients, moisture and sunlight. This cut should take place after a good seed year and after the seedlings are established.

The third kind of cut is called a removal cut. It occurs three to five years after the seed cut and involves the harvesting of mature trees in the overstory.

Throughout the shelterwood process, the subcanopy vegetation needs to be controlled so that light can reach

the red oak seedlings on the forest floor. This can be done manually, by prescribed burning or with herbicides.

### PLANTING RED OAK

Although there have been some successful red oak plantations, red oak seedlings seldom do well without the shade provided by mature trees.

Red oak seedlings are a good companion species for white pine. When planted along with white pine seedlings, tall, straight growth is encouraged for both species. Red oaks can also be planted in the shaded areas in white pine plantations. This is a good way of increasing the value of a woodlot for lumber, as well as increasing the diversity of tree species in the plantation that are available to wildlife.

For landscaping, red oak can be transplanted successfully at a young age.

## RED OAK HEALTH

Many insects and diseases affect the health of red oak trees. However, they are most damaging when combined with other stresses or when the trees are growing in low, moist areas.

Almost 30 species of fungi are associated with oaks, causing cankers and eventually wood decay. Fungal diseases can be identified by irregular growths of the stem and often by the fruiting body of the fungi which is attached to the stem. Diseased trees should be removed to prevent the fungi from spreading.

### OAK WILT

This fungal infection spreads to nearby trees by contact with roots and over long distances by sap-feeding beetles and small oak bark beetles. It causes the leaves to turn brown, beginning at the tips and edges of the tree and continuing until the tree is defoliated. The early detection

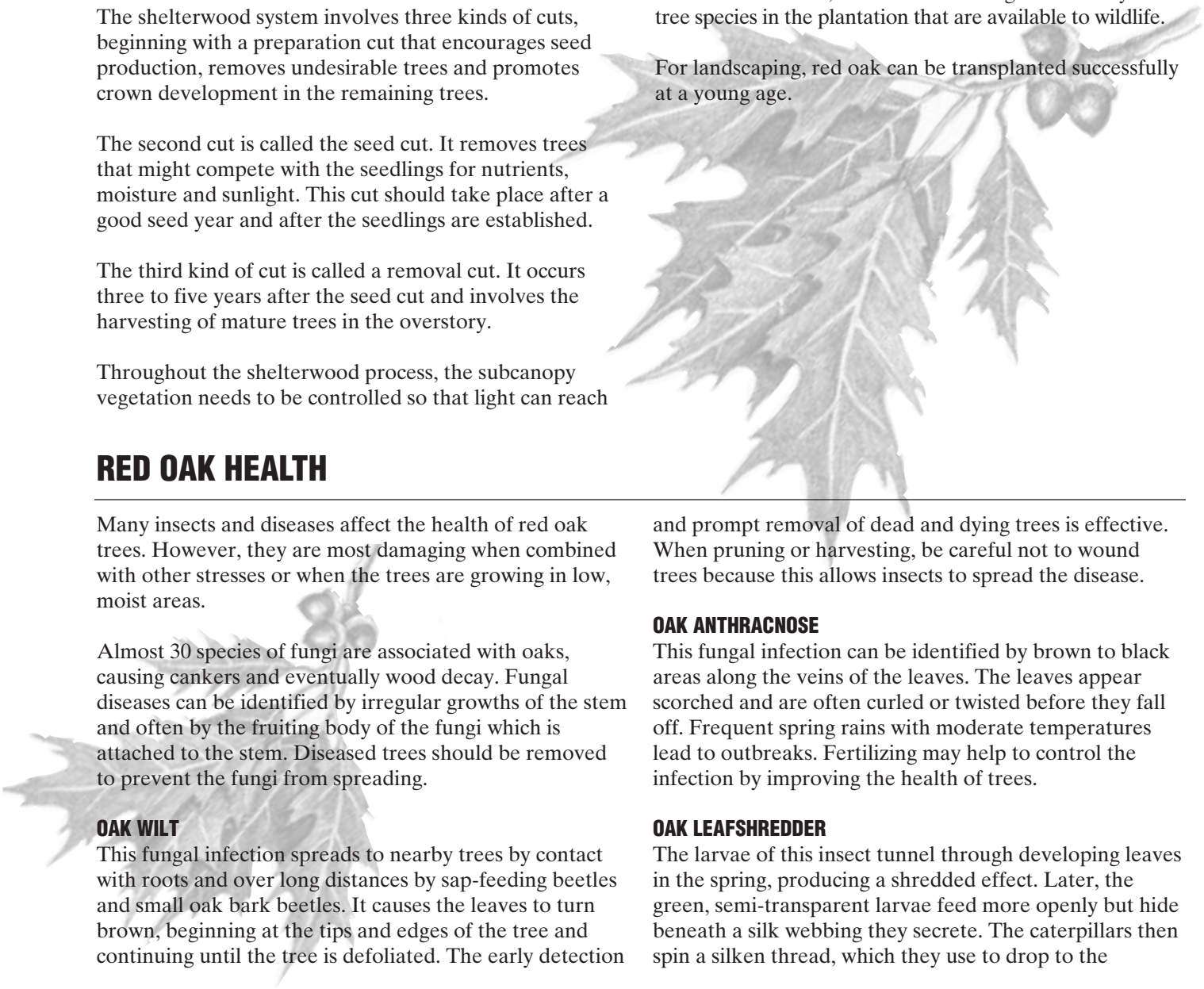
and prompt removal of dead and dying trees is effective. When pruning or harvesting, be careful not to wound trees because this allows insects to spread the disease.

### OAK ANTHRACNOSE

This fungal infection can be identified by brown to black areas along the veins of the leaves. The leaves appear scorched and are often curled or twisted before they fall off. Frequent spring rains with moderate temperatures lead to outbreaks. Fertilizing may help to control the infection by improving the health of trees.

### OAK LEAFSHREDDER

The larvae of this insect tunnel through developing leaves in the spring, producing a shredded effect. Later, the green, semi-transparent larvae feed more openly but hide beneath a silk webbing they secrete. The caterpillars then spin a silken thread, which they use to drop to the



ground. Hidden in the leaf litter on the ground, they transform into moths. Pesticides were used in the past to control heavy infestations.

### FOREST TENT CATERPILLAR

The eggs of this insect are laid in groups of 100 or more and are bonded together in bands which completely encircle the twig. The mature larvae are 50 millimetres long, hairy and brownish with a blue stripe along each side. They have a row of keyhole-shaped white spots along the back. Adults are buff brown moths with three dark bands across each forewing. Outbreaks occur in forested areas every 10 to 12 years. While damaging to trees, these insects provide food for many bird species.

Egg clusters are most easily observed in winter. Young trees can be protected by removing and destroying the egg clusters.

### GYPSY MOTH

The eggs of this insect are laid in groups of 100 or more. They are covered with a matt of buff-colored hairs, and hatch in the spring. Mature larvae are five centimetres long. These dark colored, hairy caterpillars have a double row of five pairs of blue spots and six pairs of red spots down the back. They climb to the tree tops to feed on leaves, often defoliating entire trees. The male moth is light brown with a slender body. The female is grey with a heavy body. While damaging to trees, these insects provide food for many bird species. Heavy infestations can be controlled with *Bacillus thuringiensis* (known as Bt), a bacterial enemy of the gypsy moth.

Other insects commonly found on red oak include the redhumped oakworm, the oak lace bug, the oak skeletonizer, the twig girdler and the red oak borer.

### ENVIRONMENTAL STRESSES

- drought
- fire
- industrial smog
- frost or ice
- wind
- lightning

### BIOLOGICAL STRESSES

- fungi
- insects

### STRESSES CAUSED BY POOR MANAGEMENT

- livestock grazing
- poor pruning practices
- poor thinning practices

You can protect the health of red oak stands by ensuring that your actions do not combine with other factors to weaken trees. Monitor the health of the forests in your area and watch for insect pests in your stands. Avoid cutting, pruning or other activities when your trees are stressed by insects or disease, severe weather or other factors.

You should also consider protecting your stand from livestock grazing. Livestock trample the roots of mature trees and compact the forest soil. Browsing can also introduce prickly ash, ironwood, hawthorn and other species, which are important species for wildlife but have low value for wood products.

Further reading:

- Hosie, R. 1990. *Native Trees of Canada*. Fitzhenry & Whiteside Ltd. Markham, Ontario. p192.
- Ontario Ministry of Natural Resources. 1991. *Common Pests of Trees in Ontario*. Queen's Printer. Toronto.
- Walker, L. 1984. *Trees*. Prentice Hall Canada Inc. Toronto. pp224-237.



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