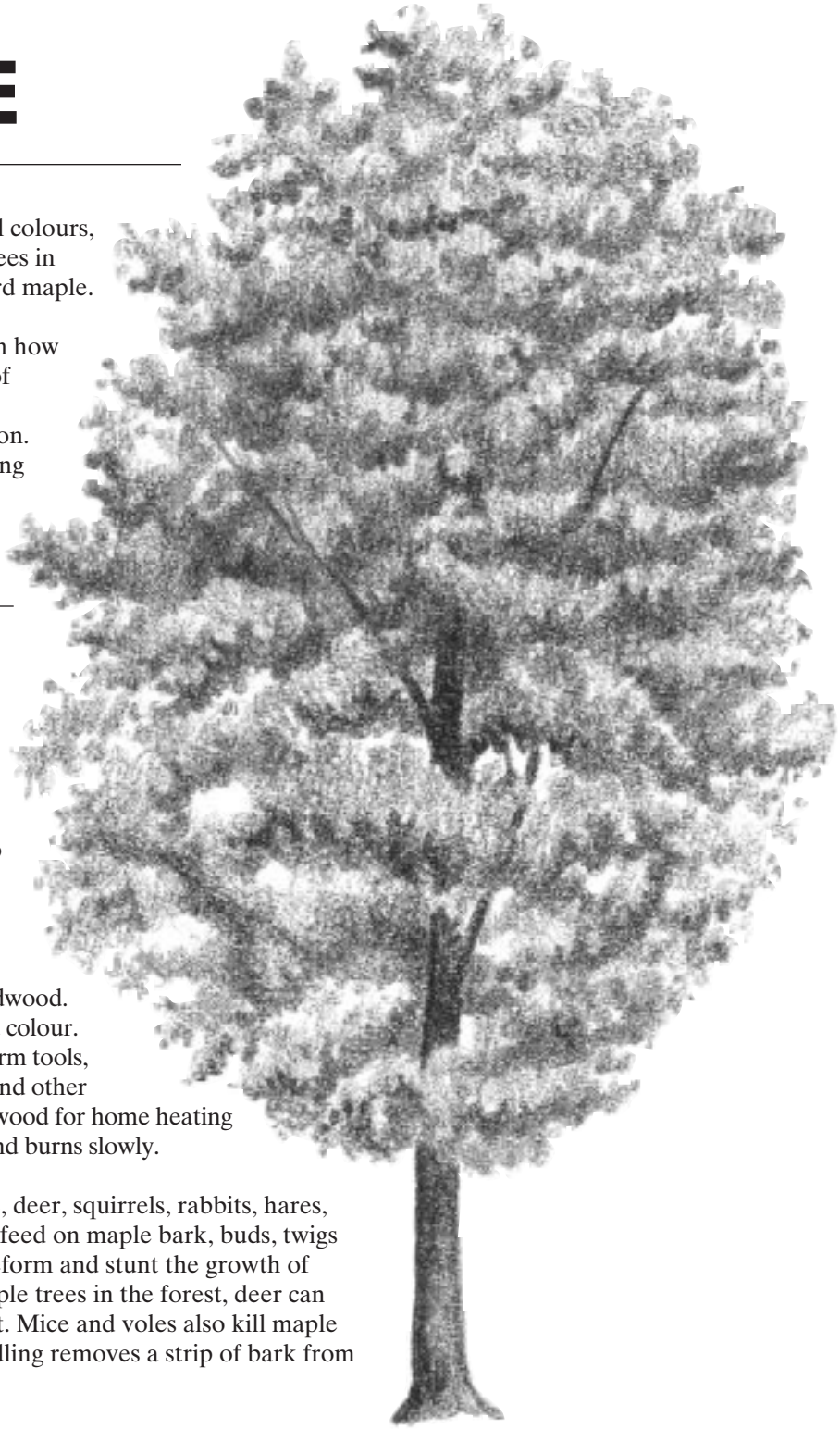
EXTENSION NOTES

Ontario

SUGAR MAPLE



Valued for its syrup, wood and beautiful fall colours, sugar maple is one of the most important trees in Ontario and Canada. It is also known as hard maple.

This extension note provides information on how to identify and grow sugar maple, the uses of sugar maple and methods for managing woodlots for wood or maple syrup production. It also includes information on factors causing sugar maple decline.

INTRODUCTION

Sugar maple was designated as Canada's national tree in 1965. The maple leaf adorns the Canadian Flag.

Aboriginal people in North America used the tree's sap to make maple sugar. The practice was later adopted by European settlers. Today, as the primary source of sap for the maple syrup industry, sugar maple is an important crop tree for farmers and woodlot owners.

Sugar maple is an important commercial hardwood. It's valued for hardness, dense grain and light colour. Sugar maple is used for furniture, flooring, farm tools, veneer, general construction, cutting blocks and other products. This species is also valued as a fuelwood for home heating because it produces a large amount of heat and burns slowly.

Sugar maple is important to wildlife. Moose, deer, squirrels, rabbits, hares, porcupines, mice and many species of birds feed on maple bark, buds, twigs and fruit. Heavy feeding by deer can kill, deform and stunt the growth of maple trees. By reducing the number of maple trees in the forest, deer can change the species composition of the forest. Mice and voles also kill maple seedlings and saplings by girdling trees (girdling removes a strip of bark from around a tree).

HOW TO IDENTIFY SUGAR MAPLE

TREE SHAPE

Mature sugar maples are large, with dense rounded crowns. In forests, sugar maple trunks are usually straight and free of branches for two-thirds or more of their height. In open fields, trunks are shorter, with a few large branches supporting a wide crown.

Sugar maples can live to be 400-years-old, reaching heights of 20 to 35 metres and diameters of 50 to 90 centimetres.

LEAVES

Sugar maple leaves are eight to 13 centimetres wide. They're a deep yellowish-green on the upper side, and paler and hairless on the under side. In autumn, they turn a brilliant red, orange or yellow.

The leaves are arranged in pairs along the twig, with each leaf opposite another. They're flat, with three or five long pointed lobes. The leaf can be easily distinguished from other maple species by two "u-shaped" notches that separate the side lobes from the centre lobe.

TWIGS

Sugar maple twigs are reddish-brown, hairless and glossy. The sharp pointed buds lie opposite each other along the twig.

BUDS

The reddish-brown buds have several pairs of faintly hairy scales.

BARK

The bark is light to dark grey and divided into long irregular strips that often curl to one side.

FRUIT

The fruit is a winged seed about 2.5 to 3 centimetres long. It matures in autumn.

WHERE SUGAR MAPLE GROWS BEST

Sugar maple is the predominant species in the Deciduous Forest Region and a common species in the Great Lakes-St. Lawrence and Acadian forest regions. In southern Ontario, sugar maple is an important component of many woodlots.

SOIL

Sugar maples grow on a variety of soils, but grow best on deep, moist, and well drained soils with medium or fine textures.

SHADE OR SUNLIGHT?

Sugar maples are tolerant of shade. They survive in the shade of other species for years until an opening in the canopy occurs and they are released to grow in partial or full sunlight.

STAND COMPOSITION

Sugar maples grow in pure and mixed stands, and even-aged and uneven-aged stands. They are commonly found with ironwood, beech, basswood, white ash, black cherry, yellow birch, white pine and red oak. As forests grow older, sugar maple becomes a predominant species.

STAND LOCATION

Sugar maples grow well on flat sites and slopes. Southern slopes, which are generally warmer, are preferred for maple sap production.

MANAGEMENT — HOW TO GROW AND CARE FOR SUGAR MAPLE

How you manage your sugar maple stand depends on your goals. Stands are usually managed for either timber or syrup production. Both methods provide other benefits, such as improved wildlife habitat and cleaner air and water.

Whatever your management goals, a forest management plan for your property can help you achieve them. Assistance with preparing a plan is available from independent forestry consultants and the Ontario Ministry of Natural Resources.

SUGAR BUSH MANAGEMENT

Sugar bushes are managed to produce the greatest amount of sap and to keep stands healthy. Stands are thinned to produce broad, deep crowns by exposing trees to sunlight. Trees with defective stems or disease are removed to encourage the growth of trees with large stem diameters and to prevent disease from spreading. Trees and woodlots are also selected for the sweetness of their syrup. Higher sugar content levels increase syrup production. Sugar content is determined by both genetic and physical characteristics of trees.

TIMBER PRODUCTION

Managing trees for timber production requires a different approach than managing for sap. The goal is to produce trees with long, straight, branch-free stems, which are highly valued for wood products. To encourage trees to grow upward, rather than branching at lower levels, timber stands are not thinned as heavily as sugarbushes. This encourages trees to grow tall and straight as they compete for sunlight. Trees with small stems and trees that are diseased or defective are removed by carefully timed thinnings.

REGENERATING SUGAR MAPLE

The best way to establish a sugar maple stand is natural regeneration. Sugar maples produce large numbers of seeds. Wherever a sugar maple is growing in the forest, there are hundreds of seedlings nearby. The seedlings respond well to sunlight. To assist natural regeneration, areas can be thinned to create openings in the forest canopy and allow sunlight to reach the forest floor. From a seedling density of more than 300,000 per hectare, only a few hundred trees will grow to maturity.

Sugar maples can also sprout from stumps and roots. However, trees that grow from stump sprouts are more susceptible to disease than trees grown from seeds. At maturity, trees grown from sprouts can be recognized as clumps of two or more stems connected near the ground.

PLANTING SUGAR MAPLE

Sugar maple can be planted in fields but intensive care is needed to ensure survival. Seedlings need to be protected from competition with other plants for sunlight, water and nutrients. They also need to be protected from mice, deer and other wildlife. Tree shelters (plastic tubes that allow light to pass through them) offer good protection from wildlife. For information on tree shelters see the extension note *Tree Shelters Help Hardwood Trees Grow Faster.*

WOODLOT GRAZING

Livestock should not be allowed to graze in woodlots. Livestock eat sugar maple seedlings and trample the roots of mature trees.

SUGAR MAPLE HEALTH

The health of sugar maple forests became a major concern in the 1980s when symptoms of decline were noticed in sugar maple forests. Decline and dieback (loss of crown) is usually seen in mature trees. Symptoms include:

- increasing loss of buds, twigs and branches in the upper crown
- small leaves
- early leaf discolouration and loss of leaves
- vine-like branches sprouting from a tree trunk

National and international projects were established to monitor the problem and to determine its causes. These included the North American Maple Decline Project and the Acid Rain National Early Warning System.

Today, researchers believe that maple decline exists, but that it is not as common or as serious as believed. While acid rain may be a factor in some areas, research indicates that most sugar maple decline is caused by one or a combination of stresses that weaken trees. Stresses include severe weather, insect damage, altered drainage and poor management practices.

The following stresses contribute to maple decline and dieback:

ENVIRONMENTAL STRESSES

- wind
- frost or ice damage
- lightning damage
- drought

- sunscald
- excessive water
- lack of nutrients

BIOLOGICAL STRESSES
- overmaturity
- overcrowding
- rotting and decay
- leaf loss from insects
- wildlife damage

STRESSES CAUSED BY POOR MANAGEMENT
- improper tapping
- livestock grazing
- careless use of machinery, especially in the early summer when bark is easily knocked off trees
- thinning during periods of drought or insect infestation

Woodlot owners can protect the heath of maple stands by ensuring that their actions do not combine with other factors to weaken trees. They should monitor the health of forests in their area and watch for insect pests in their stands. Careful consideration should be given to cutting, tapping or other activities when trees are stressed by insect outbreaks or severe weather.

Further reading:

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- Burns R.M., Honkala B.H., *Silvics of North America* Vol. 2, Hardwoods. U.S. Dept. of Agriculture. Agriculture Handbook 654.
- Ontario Ministry of Natural Resources. 1990. *A Silvicultural Guide for the Tolerant Hardwood Working Group in Ontario.* Queens Printer. Science and Technology Series, Volume 7.

FOREST MANAGEMENT SYSTEMS FOR SUGAR MAPLE

	Method	Results
Shelterwood	A mature forest stand is harvested in two or three separate cuts to allow mature areas to seed and partially shade new growth. A final cut removes the last section of mature forest to allow the next crop to develop in open sunlight.	• Even-age stands • Mixture of shade tolerant and intolerant species • Can be visually unattractive until new growth develops • Long time between harvests
Selection	Mature and immature trees are cut as individual trees or as groups in a series of harvests. The goal is to create a stand of trees of different sizes and ages.	• Uneven-age stands • Tends to produce shade tolerant species • Treatment may be required to maintain intolerant species • Usually visually attractive
Seed Tree	Most of the trees in an area are harvested in one cut. A few trees are left to seed the cleared area naturally. When new growth is established, seed trees are removed.	• Even-age stands • Rarely used in hardwoods • A mixture of tolerant and intolerant species • Can be visually unattractive • Long time between harvests
Clearcutting	All the trees in an area are cut at the same time. The area is regenerated naturally by releasing existing seedlings or by stump or root sprouts, or artificially by seeding or planting. Many stands in southern Ontario are the result of clearcuts.	• Even-age stands • A mixture of tolerant and intolerant species • Can be visually unattractive • Long time between harvests

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