

INTRODUCTION

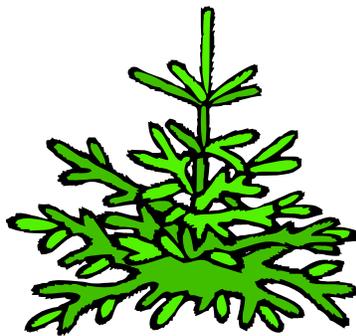
Virtually everyone would agree: trees and forests provide our society with so many benefits that they have become fundamental to our quality of life. In fact, even the idea of a treeless city or countryside is unimaginable to most people. Even so, we have tended to take the future of forests for granted - we have severely disturbed and continue to disturb what was once a natural forested landscape. We must take better care of the trees we have and just as importantly, we need to plan for the forests of the future.

Whether it's to attract wildlife, grow timber or improve the local environment, each spring private landowners plant thousands of tree seedlings across Ontario. Although there can be any number of reasons 'why' these seedlings are planted, each and every landowner starts off with the same overall objective – to have as many of the trees as possible survive to grow another year.

Now more than ever, landowners are asked to demonstrate good stewardship and to do it with a fraction of the public support they were once accustomed to. In Ontario, the

large-scale, heavily subsidized planting programs that resulted in thousands of hectares of land returned to forest are a thing of the past. Although some planting programs are available, most require a significant investment on behalf of the landowner. In many cases landowners are choosing to purchase and plant trees on their own. Often they are unfamiliar with planting methods that will ensure good survival and as a result, every summer many trees die unnecessarily. While it can be expected that some of the trees will die, it is important to minimize the chance of unnecessary and excessive mortality caused by either poor planting technique or improper species selection. One of the most important things a landowner can do is choose the right tree for the right site. Keep in mind that tree planting is expensive, and no tree planting operation is more expensive than a failed one. Choosing the right tree is the first step to ensuring that the landowner's efforts and money are not wasted.

Although you may never sit in its shade, plant a tree for those who will.



1. THE IMPORTANCE OF CHOOSING THE RIGHT TREE

Jane Landowner spent a lot of time and money planting 10,000 Red Pine seedlings on her 4 hectare field. Her decision to plant red pine was primarily based on the cost and availability of the seedlings - at the time about 32 cents per tree. Unfortunately for Jane, the site was poorly drained and most of the trees died during the following spring. If Jane had spent more time assessing the site, and her choice of species she would have known that red pine does not do well in wet soils. She should have purchased a more suitable species like eastern white cedar and although, she may have had to pay more per seedling, the survival would have been much higher. In this case, the only thing that wasn't poorly drained was Jane's bank account!

Even if you know very little about how our native trees and forests grow it is probably a good bet that you are aware that different species of trees are found on different sites. Like all other types of plants, trees have specific growing requirements. As a result, each site has its own capability, and in the same way, its own limitations for growing trees. In the example, it was unfortunate that Jane had to find out the hard way that the relationship of species and site is an important one. In this case, a lot of money was wasted planting a species of tree that

was unsuitable for the site available. Obviously, one of the most important first steps a landowner can make is to ensure that the right species is chosen for their site.

Choosing the right species for the site does not always guarantee success, but choosing the wrong species is sure to guarantee failure. So spend some time determining what your site characteristics are and if you are still unsure, consult a professional.



2. GETTING TO KNOW YOUR SITE

When forest managers refer to site characteristics, they are talking about a broad range of physical and chemical properties. Once you know a site's characteristics, you can determine what species will grow well (and those that won't!). In most cases, there will be a few species that should do well on the site - think about the many different species you find in most natural forests. This gives you a chance to base your final species selection on additional considerations like long-term objectives, species availability and cost.

Although your site may have several unique characteristics that separate it from others, only two, *soil type* and *drainage*, influence how well one species will do compared to another.

Soil Type

Although you don't have to be a soils scientist to plant trees, knowing a little about soil is valuable. Trees depend on soil to anchor them in place, provide moisture

and nutrients, and to act as a seedbed for future generations. All soils are made up of four main ingredients: mineral particles (the bulk of the material), air spaces between the particles, water in varying amounts, and some organic matter from plant and animal debris. Classifying soils is primarily a quantification of the different ingredients found within it.

Mineral particles range from boulders as large as basketballs, to tiny particles so small that can't be seen without a powerful microscope. Soil texture is the relative proportion of the individual particles. A handful of dirt rubbed between your fingers will have a certain amount of 'grittiness' to it. The more abrasive the soil feels the larger the individual particles; the smoother the soil feels the smaller the particles. This grittiness (or the lack of it) is a relative measure of three main soil particle sizes – sand, silt and clay. Sand has the largest particles, which feel "gritty". Silt has medium sized particles that feel soft, silky or "floury". Clay has the smallest particles and feels "sticky". The amount of sand

versus silt versus clay within the soil directly affects a tree species' ability to grow on a site.

There are three broad textural classes: sandy soils, loamy soils and clay soils. The term loam refers to soils with more equal proportions of sand, silt and clay. Although there can be many combinations of classes such as sandy loam, loamy sand or even clay loam, it is only really necessary to determine which of the three general classes you have.

Table 1 lists some common properties to look for when assessing a soil texture class. Grab a handful of soil - does it feel gritty or smooth? Squeeze the soil in your hand. Does it form a cast (clump)? Lightly wet the soil and try it again. Try to make a soil ribbon (Fig. 1) by lightly wetting the soil until it feels like moist putty. Then, try to squeeze it between your thumb and forefinger upwardly into a thin flat ribbon – if a ribbon forms the soil contains clay. The longer the ribbon, the more clay it contains.



Source: <http://ltpwww.gsfc.nasa.gov/globe/stories/clays.htm>

Figure 1: Making a soil ribbon

Table 1 – Soil Texture Class Assessment Properties

Soil Texture Class	Visual Appearance	Reaction when squeezed in the hand		Ability to form a ribbon
		Dry Soil	Moist Soil	
Sand Soils	<ul style="list-style-type: none"> Granular with easily detectable particles 	<ul style="list-style-type: none"> Will not form a cast or, cast easily falls apart 	<ul style="list-style-type: none"> Forms a cast that crumbles easily 	<ul style="list-style-type: none"> Can not form a ribbon
Loam Soils	<ul style="list-style-type: none"> Low to moderately granular Can form clumps/clods when dry 	<ul style="list-style-type: none"> Forms a cast that can be handled relatively easily 	<ul style="list-style-type: none"> Forms a cast that can be easily handled 	<ul style="list-style-type: none"> pure loam can not form a ribbon loam with more silt and clay will form fragile ribbon
Clay Soils	<ul style="list-style-type: none"> Fine texture with very few large particles When dry, forms hard clumps 	<ul style="list-style-type: none"> Forms a cast that can be handled freely 	<ul style="list-style-type: none"> Forms a cast that can be worked and is cohesive 	<ul style="list-style-type: none"> Forms a long flexible ribbon

Adapted from US Department of Labor web site <http://www.osha-slc.gov/doc/outreachtraining/htmlfiles/soiltex.html>

Drainage

Drainage is the second site characteristic that needs to be assessed before making a species selection. How well your site holds water can have a dramatic impact on the long-term survival of different species. Drainage is influenced by soil texture. The smaller the particle size the more water the site holds – a clay soil can hold considerably more moisture than a sandy soil. Soil depth, recent precipitation, topography, depth to the water table, and the amount and type of vegetation also influence drainage in one way or another.

Soil drainage can be classified into four different categories.

1. Well Drained – water drains from the site rapidly; water seldom pools on the site even during a heavy rain or after snow melt
2. Moderately Drained – water may pool but only for brief periods

3. Imperfectly Drained – water pools on the site, sometimes for extended periods especially during the spring or in wet years;
4. Poorly Drained – water drains slowly from the site throughout the year; soil may appear wet below the surface.

Determining the drainage of your site is relatively easy and usually comes from observing what happens to the site in the spring and fall, as well as during and after a rainfall.



Site Variability

The area you intend to plant may not be uniform especially if there is variation in topography. You should assess the entire site looking for differences that might affect your choice of species. If your site differs in

either soil texture or drainage you may need to choose different species for certain areas.

Mary Landowner planted 100 Red Oak trees along her sloping laneway. After five years most of the trees were still alive although Mary noticed that the oaks in the higher well drained end of the laneway were thriving while those in the lower portion which flooded every spring were just barely hanging on. Mary should have chosen a more suitable species for the wetter area.



3. CHOOSING THE RIGHT SPECIES FOR YOUR SITE

Now that you have determined both soil texture and drainage of your site, you can start to narrow down your species choice(s). Each species is adapted to a range of site conditions, which are categorized in the Table 2.

More detail on the specific site requirements for the many different species is provided in

Appendix 1 of this booklet. In addition there are many other sources of information on individual tree species, their requirements, how they grow and how to look after them - consult one of the partners who helped produce this publication. Information on these agencies and others is listed in Appendix 2.

Table 2: Species recommended for different site conditions

Soil Texture	Natural Drainage	
	Well to Moderate	Imperfect to Poor
Sand	White pine, Red Pine European Larch, Norway Spruce, Sugar Maple, Red Oak, White Cedar, Poplar, Black Locust	White Pine, Tamarack, Black Spruce, Willow, Green Ash
Loam	White pine, Red Pine European Larch, Norway Spruce, White Spruce, Black Spruce, White Cedar, Sugar Maple, Red Maple, White Ash, Green Ash, Red Oak, Black Cherry, Beech, Basswood, Black Walnut, Bitternut Hickory, Poplar, Black Locust	White Cedar, Tamarack, Black Spruce, Silver Maple, Red Maple, Willow
Clay	White pine, European Larch, Norway Spruce, White Ash, Green Ash, White Cedar, Beech, Poplar, Black Locust, Black Walnut	Tamarack, Black Spruce, Silver Maple, Green Ash, Willow

4. CHOOSING A SPECIES THAT MEETS YOUR NEEDS

Choosing the right species is not just a matter of determining which one will survive on your site and which ones won't. You need to consider your own long-term objectives for the trees. Are you planting a windbreak along a field, or, are you establishing a stand of trees for wood products? Do you want to attract birds to your garden, or, do you want to rehabilitate your cottage shoreline? What you want to do

on the property affects how you will do it. The most appropriate choice of tree species is one that will thrive on your site once it is planted, and one that will also grow to meet your personal needs in the future. Table 3 lists some species that are suitable for some of the common tree planting objectives. Look for the species that are suited to your site and your objectives.

Table 3: Commonly planted species by property objective

Objective	Species (* = non-native species in Eastern Ontario)
Wildlife (cover or mast)	Fruiting shrubs, Ironwood, Red Oak, Burr Oak, Black Cherry, Cedar, Hemlock, *Black Walnut
Timber	Red Pine, White Pine, White Spruce, White Ash, Red Oak, Hard Maple
Christmas Trees	White Spruce, *Norway Spruce, Balsam Fir, *Fraser Fir, *Scotch Pine, (White Pine)
Windbreaks	*Norway Spruce, White Spruce, Cedar, Poplar (fast)

Susan Landowner would like to see a sugar maple forest returned to her old pasture. However the current site is exposed and the loamy sand soils are somewhat compacted and undernourished after many years of grazing. She could plant thousands of sugar maple seedlings, but a local forest manager suggests that maple which naturally regenerates in a shaded moist soil will struggle and not do well for many years. He suggests planting white or red pine, which can handle the light drier soils and open conditions. As the pine grows it will shade the site. Sugar maple and white ash seed from Susan's neighbour's forest will seed in among the pine. Susan will also benefit from harvest and sale of the pine on her way to a naturally regenerated sugar maple forest.

In Table 3 the **bolded** species are those that should do well on an average planting site – open and exposed old-field sites with varying amounts of competition from other plants such as grasses. The remaining species are those which regenerate naturally

beneath a forest canopy in cool, moist forest soils that have lots of organic matter. These species, although they can survive in the open, do better when planted under or among existing trees.

Bill Landowner wanted to create a windbreak along the field behind his barn. He assessed his site and knows its soils are shallow and dry. From the table, he sees that Cedar as well as White and Norway Spruce would eventually provide adequate protection from the prevailing winds. But he chooses to plant only cedar because his shallow, dry site is not recommended for spruce.



5. CHOOSING THE RIGHT STOCK FOR YOUR SITE

Now that you have chosen a species that is adapted to your site and that meets your needs, it is time to ensure that the trees you order from the nursery will be adapted to your climate. That is, make sure they were grown from seed that came from an area with a climate similar to the area where they will be planted.

Nurseries grow seedlings from seeds or from cuttings. Although most tree species grow across large geographic areas, over many generations local populations have evolved to be specially adapted to local climatic conditions and as a result, seedlings need to be planted in the area from which their seed came. There are examples where trees have

flourished once moved to a different area - but these situations must be viewed as lucky experiments. In many cases moving trees from one climate to another is an experiment that does not work out so well - ecologically or economically!

The map on the following page shows the different Tree Seed Zones for Ontario. Trees grown from seed collected within one seed zone are genetically adapted to the climate of that zone and can be safely planted within the same zone. It is important to ensure that your stock came from the zone of your planting site. Ask about it when you order the stock. For more information on seed zones contact the FGCA (Appendix 2).

Tom Landowner lives outside Peterborough and his brother has a farm in the Niagara area. Tom wanted to reforest an area behind his house and tried to save some money by transplanting Red Oak seedlings from his brother's farm. Although the site was well suited to Red Oak, and the seedlings grew several feet each year, they were frequently killed back by the fall frosts and never grew that well. If Tom had known that seed source matters, he might have saved himself a lot of work.

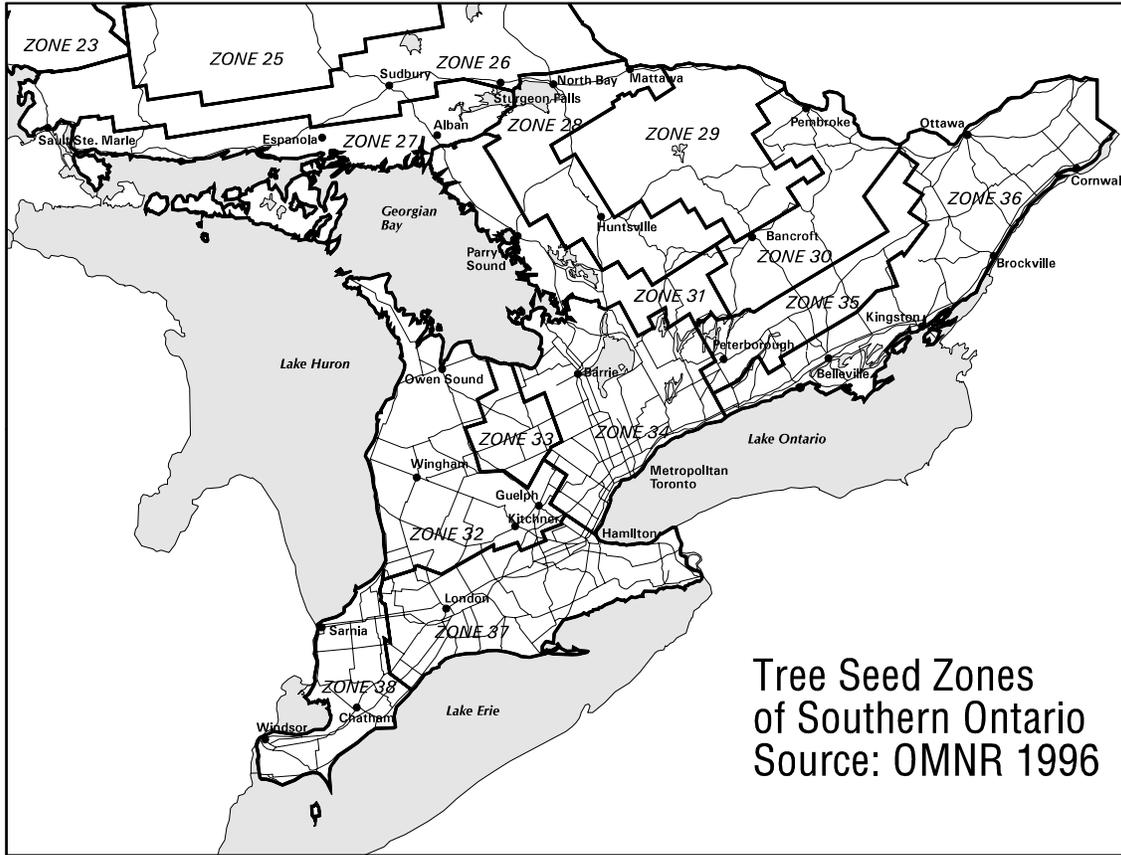


Figure 2 Ontario Tree Seed Zones (OMNR 1996)



Appendix 1: Species Characteristics

Native Evergreen Conifers

White Pine

Pinus strobus

35 metres
(115 feet)
100+years



Bareroot
Seedlings
3 years old
15 - 35 cm tall



Ontario's tallest tree & provincial tree

Appearance	<ul style="list-style-type: none"> clusters of 5 soft, long, bluish green needles Smooth, young bark, dark ridged mature bark
Site & soils	<ul style="list-style-type: none"> best on well drained to moist, sand & loams. Tolerates shade when young.
Rural plantings	<ul style="list-style-type: none"> reforestation, timber plantations Plant at 6ft spacing - grows 2-3 feet/year once established. Plant under canopy of taller trees to help avoid white pine weevil problems. Grows well with red pine, maple, ash & beech
Urban settings	<ul style="list-style-type: none"> prune for landscaping purposes; sensitive to salt and air pollutants
Native to	<ul style="list-style-type: none"> southern and central Ontario

Red Pine

Pinus resinosa

25 metres
(80 feet)
100 +years



Bareroot
Seedlings
2 - 3 years old
12 - 35 cm tall



Highest yielding conifer plantation species

Appearance	<ul style="list-style-type: none"> clusters of 2 brittle, long, shiny dark green needles Scaly, pinkish gray bark, furrowed with age
Site & soils	<ul style="list-style-type: none"> good on infertile, well drained, sandy, gravelly soils. Needs full sunlight
Rural plantings	<ul style="list-style-type: none"> reforestation, timber plantations Plant at 8 by 8 feet - Grows 2-3 feet/year once established. Periodically thin to maintain health and growth. Grows well with white pine, aspen
Urban settings	<ul style="list-style-type: none"> reddish bark is striking with dark green foliage; doesn't thrive in inner city
Native to	<ul style="list-style-type: none"> central Ontario

White Spruce

Picea glauca

25 metres
(80 feet)
100+ years



Bareroot
Seedlings
3 years old
15 - 35 cm tall



Appearance	<ul style="list-style-type: none"> short whitish or bluish green needles, wide form
Site & soils	<ul style="list-style-type: none"> best on well drained, moist silty soils. Tolerates poorly drained and heavy soils. Avoid dry sites. Tolerates shading. Slow initial growth then 1-2 feet/year on good sites once established.
Rural plantings	<ul style="list-style-type: none"> reforestation, timber plantations, Christmas trees Plant at 8 by 8 feet, but thin periodically to maintain health and growth. Grows well with many species.
Urban settings	<ul style="list-style-type: none"> windbreaks, landscaping
Native to	<ul style="list-style-type: none"> central and northern Ontario

Red Spruce

Picea rubens

25 metres
(80 feet)
100+ years



Bareroot
Seedlings
3 years old
15 - 35 cm tall



Appearance	<ul style="list-style-type: none"> yellow to dark green needles, often pressed close to yellow-orange twig Broad, open form
Site & soils	<ul style="list-style-type: none"> well drained, moist silty soils, cool moist sites. Very tolerant of shade. Best planted under taller trees or in small openings.
Rural plantings	<ul style="list-style-type: none"> reforestation, wildlife cover. Grows well with white pine, balsam fir, yellow birch, sugar maple
Urban settings	<ul style="list-style-type: none"> uncommon
Native to	<ul style="list-style-type: none"> central Ontario (but uncommon)

White Cedar

Thuja occidentalis

15 metres
(50 feet)
80+ years



Bareroot
transplant
Seedlings
2 - 4 years old
15 - 60 cm tall



Appearance	<ul style="list-style-type: none"> yellow to green scale-like leaves, turning bronzy green in winter, broad, dense, columnar form, thin red brown young bark, gray brown mature bark in strips
Site & soils	<ul style="list-style-type: none"> does well on many sites; dry, wet or shallow soils. Tolerant of shade
Rural plantings	<ul style="list-style-type: none"> reforestation, site restoration, wildlife plantings for browse & cover. Slow growing. Grows well with white pine, balsam fir, yellow birch, sugar maple
Urban settings	<ul style="list-style-type: none"> common as hedges, windbreaks, easily pruned
Native to	<ul style="list-style-type: none"> Ontario

Jack Pine

Pinus banksiana

20 metres
(65 feet)
80+ years



Bareroot
Seedlings
2 years old
15 - 35 cm tall



Appearance	<ul style="list-style-type: none"> clusters of 2 short, yellow -green needles thin, reddish-gray young bark, dark brown, flaky & ridged mature bark
Site & soils	<ul style="list-style-type: none"> does well on many sites; will tolerate sandy, gravelly sites. Needs full sunlight.
Rural plantings	<ul style="list-style-type: none"> restoration of droughty sites, timber plantations on better sites Grows in pure stands or with birch, aspen, red pine.
Urban settings	<ul style="list-style-type: none"> unknown
Native to	<ul style="list-style-type: none"> northern and central Ontario

Pitch Pine

Pinus rigida

20 metres
(65 feet)
100 years



Bareroot
Seedlings
2 years old
12 - 20 cm tall



Only native conifer able to sprout from damaged/cut stumps

Appearance	<ul style="list-style-type: none"> clusters of 3 brittle, long, yellow-green needles Scaly, pinkish gray bark, furrowed with age (similar to red pine)
Site & soils	<ul style="list-style-type: none"> tolerates extreme sites - wet or shallow, dry soils. Needs full sunlight..
Rural plantings	<ul style="list-style-type: none"> restoration of droughty sites Grows in pure stands or mixed with species such as white oak, gray birch
Urban settings	<ul style="list-style-type: none"> drought and salt resistant, interesting form
Native to	<ul style="list-style-type: none"> small area along St Lawrence River east of Kingston

Balsam Fir

Abies balsamea

20 metres
(65 feet)
60 years



Bareroot
transplant
seedlings
4 years old
15 - 35 cm tall



Only native fir in eastern Canada

Appearance	<ul style="list-style-type: none"> short dark green needles arranged along twig for flat branch effect. Very regular conical form, with spire-like tip Grey, smooth young bark with resin blisters, brownish scaly older bark
Site & soils	<ul style="list-style-type: none"> adapted to a variety of soils. Very tolerant of shade.
Rural plantings	<ul style="list-style-type: none"> reforestation, Christmas trees. Grows well in pure stands or with birch, aspen, white spruce or hemlock
Urban settings	<ul style="list-style-type: none"> windbreaks, landscaping
Native to	<ul style="list-style-type: none"> central and northern Ontario

Native Deciduous Conifers

Tamarack

Larix laricina

25 metres
(80 feet)
80 years



Bareroot
Transplant
Seedlings
1-2 years old
15 - 35 cm tall



Loses needles in the fall

Appearance	<ul style="list-style-type: none"> tufts of many soft, short, bluish-green needles, yellow and fall off in fall thin, smooth gray young bark, reddish-brown, scaly mature bark
Site & soils	<ul style="list-style-type: none"> tolerates wet, poorly drained sites, grows better on moist, sandy soils. Needs full sunlight.
Rural plantings	<ul style="list-style-type: none"> reforestation Fast initial growth on good sites. Grows well in pure stands or with birch, aspen, spruce. Sensitive to chemical weed control.
Urban settings	<ul style="list-style-type: none"> uncommon, but has brilliant yellow fall colour, light green spring colour
Native to	<ul style="list-style-type: none"> northern and central Ontario

Exotic Evergreen Conifers

Norway Spruce

Picea abies

30 metres
(100 feet)
100+ years



Bareroot
Seedlings
2-3 years old
12-35 cm tall



Appearance	<ul style="list-style-type: none"> short dark green needles thin, reddish-brown young bark, dark purplish-brown, scaly mature bark
Site & soils	<ul style="list-style-type: none"> best on well drained to moist, sand & loams (similar to white pine). Avoid wet or dry sites. Tolerates some shade
Rural plantings	<ul style="list-style-type: none"> timber plantations Plant at 8 by 8 feet. Grows 2 -3 ft/year on good sites
Urban settings	<ul style="list-style-type: none"> windbreak species, distinctive drooping branches, drought susceptible
Native to	<ul style="list-style-type: none"> Europe and Asia; adapted to southern and central Ontario

Scots Pine

Pinus sylvestris

25 metres
(80 feet)
80 years



Bareroot
Seedlings
2 years old
15 - 35 cm tall



Can be invasive and displace native species in natural areas

Appearance	<ul style="list-style-type: none"> clusters of 2 short, bluish to grayish -green needles thin, orange papery young bark; gray brown, scaly plates on mature bark
Site & soils	<ul style="list-style-type: none"> sandy gravelly sites, other poor quality sites. Needs full sunlight
Rural plantings	<ul style="list-style-type: none"> common Christmas tree otherwise not recommended. Fast growth. Subject to insect and disease damage especially in a pure stand.
Urban settings	<ul style="list-style-type: none"> common; distinctive orange, papery inner mature bark
Native to	<ul style="list-style-type: none"> Europe and Asia

Austrian Pine

Pinus nigra

20 metres
(65 feet)
80 +years



Bareroot
Seedlings
2 years old
10+ cm tall



Appearance	<ul style="list-style-type: none"> clusters of 2 long, dark green needles, broad form yellow-brown flaky young bark, dark gray-brown, furrowed mature bark
Site & soils	<ul style="list-style-type: none"> tolerates a wide variety of soils
Rural plantings	<ul style="list-style-type: none"> not recommended
Urban settings	<ul style="list-style-type: none"> very common ornamental; drought and salt resistant; interesting form
Native to	<ul style="list-style-type: none"> southern Europe

Appendix 1: Exotic Evergreen Conifers continued ...

Mugho Pine

Pinus mugo

Low shrub to small tree
Medium-lived



Bareroot seedlings
2 years old
12 - 20 cm tall



Appearance

- long, dark green needles, upsweeping branches, low spreading form. dark gray, scaly bark

Site & soils

- adapted to a variety of soils, used for erosion control

Rural plantings

- not recommended

Urban settings

- very common ornamental (requires pruning to keep good form), salt tolerant - common along roadways

Native to

- mountains of southern Europe

Exotic Deciduous Conifer

European Larch

Larix decidua

25 metres
(80 feet)
80 years



Bareroot Seedlings
2 years old
15+ cm tall



Loses needles in the fall

Appearance

- tufts of many soft, short, bright green needles, yellow and fall off in fall

Site & soils

- grows best on moist, sandy soils. Needs full sunlight.

Rural plantings

- plantations for wood products at 8 x 8 ft spacing. Fast initial growth on good sites. Sensitive to chemical weed control.

Urban settings

- ornamental, brilliant fall colour, pretty, bright green spring colour

Native to

- Europe

Japanese Larch

Larix kaempferi

25 metres
(80 feet)
80 years



Bareroot Seedlings
2 years old
15+ cm tall



Loses needles in the fall

Appearance

- tufts of soft, short, grayish or bluish-green needles, orange- brown twigs, needles turn yellow and fall off in fall

Site & soils

- grows best on moist, sandy soils. Needs full sunlight.

Rural plantings

- plantations for wood products at 8 x 8 ft spacing. Fast initial growth on good sites. Sensitive to chemical weed control.

Urban settings

- ornamental, brilliant fall colour, pretty, bright green spring colour

Native to

- mountains of Japan

Native Broadleaf Trees

Sugar Maple

Acer saccharum

30 metres
(100 feet)
100+years



Bareroot Seedlings
2 years old
15 + cm tall



Canada's national tree

Appearance

- deep yellow green, lobed leaves, broad spreading open grown form smooth, young bark, dark irregularly-ridged mature bark

Site & soils

- best on deep, fertile, well-drained to moist loams. Tolerates shade when young. Responds well to thinning.

Rural plantings

- reforestation, maple sugar orchards. Grows well with white pine, hemlock and other broadleaf trees

Urban settings

- sensitive to salt and air pollutants, hot dry conditions & compacted soils. Brilliant fall colour

Native to

- central and southern Ontario

Black Maple

Acer nigrum

As for sugar maple

Note

- Closely related to sugar maple, known for its higher sugar content. Leaves have a droopy appearance and a fuzzy underside.

Silver Maple

Acer saccharinum

25 metres
(80 feet)
80 years



Bareroot Seedlings
1-2 years old
15 - 20 cm tall



Appearance

- light green (lighter below), deeply cut leaves, spreading open grown form smooth, young bark; gray brown, shaggy mature bark

Site & soils

- best on deep, fertile, moist loams (withstands seasonally wet soils) Needs full sunlight.

Rural plantings

- reforestation, plantations for pulp and timber Grows fast

Urban settings

- aggressive roots & brittle branches make it unsuitable to inner city areas. Pale yellow fall colour

Native to

- central and southern Ontario

Red Maple

Acer rubrum

25 metres
(80 feet)
80 years



Bareroot Seedlings
2 years old
15+ cm tall



Appearance

- light green (lighter below), lobed, toothed leaves, wide open grown form smooth young bark; gray brown, scaly, ridged mature bark

Site & soils

- adapted to a variety of soils - wet and dry. Best on moist sites. Tolerates some shade when young

Rural plantings

- reforestation, plantations for pulp and timber

Urban settings

- common ornamental, brilliant fall colour - deep red

Native to

- central and southern Ontario

Appendix 1: Native Broadleaf Trees continued ...

Red Oak

Quercus rubra

25 metres
(80 feet)
100+years



**Bareroot
Seedlings**
1-2 years old
12 - 20 cm tall



Appearance

- dull green bristle tipped leaves
smooth, lined young bark, grooved & ridged dark mature bark

Site & soils

- best on deep well drained sandy loam; tolerates drier conditions. Avoid heavy, wet soils. Tolerates some shade when young. Responds well to thinning.

Rural plantings

- reforestation, timber plantations, wildlife food source. Grows well with pines, & other broadleaf trees

Urban settings

- large, attractive ornamental Tolerates urban conditions

Native to

- southern and central Ontario

White Oak

Quercus alba

30 metres
(100 feet)
100 +years



**Bareroot
Seedlings**
2 years old
15+ cm tall



Appearance

- bright green, round lobed leaves
pale gray scaly young bark, similar mature bark, with a reddish cast

Site & soils

- best on deep well drained loams; avoid dry or poorly drained conditions. Tolerates some shade when young

Rural plantings

- reforestation, timber plantations, wildlife food source. Grows well with pines, hemlock & other broadleaf trees

Urban settings

- large, attractive ornamental

Native to

- southern and eastern Ontario

Bur Oak

Quercus macrocarpa

25 metres
(80 feet)
200+ years



**Bareroot
Seedlings**
2 years old
15+ cm tall



Appearance

- shiny green, round lobed leaves, corky twigs and branches
Rough furrowed young bark, deeply furrowed mature bark

Site & soils

- adapted to a range of soils - dry to moist; sand or clay. Tolerates some shade

Rural plantings

- reforestation, timber plantations, wildlife food source. Grows well with pines, hemlock & other broadleaf trees

Urban settings

- tolerant of urban conditions, large, attractive ornamental

Native to

- southern and eastern Ontario

White Ash

Fraxinus americana

30 metres
(100 feet)
100 years



**Bareroot
Seedlings**
2 years old
15+ cm tall



Appearance

- dark green compound leaves with 5-9 leaflets
light gray young bark, finely furrowed mature bark

Site & soils

- deep, well-drained upland soils. Avoid dry infertile sites. Tolerates some shade

Rural plantings

- reforestation, mixed species timber plantations Grows well with white pine, balsam fir, yellow birch, sugar maple

Urban settings

- common urban tree, columnar form, yellow-purple fall colour

Native to

- southern and central Ontario

Green Ash

Fraxinus pennsylvanica

20 metres
(65 feet)
60 years



**Bareroot
Seedlings**
1 - 2
years
old
12 - 20
cm
tall



Appearance

- yellow green compound leaves with 5-9 leaflets
light gray young bark, finely furrowed mature bark

Site & soils

- adapted to a wide range of soils, can tolerate some flooding, tolerates some shade when young

Rural plantings

- reforestation Grows well with silver maple, cottonwood and willow

Urban settings

- common urban tree, columnar form Yellow fall colour.

Native to

- southern and central Ontario

Black Ash

Fraxinus nigra

20 metres
(65 feet)
100 years



**Bareroot
Seedlings**
2 years old
15+ cm tall



Appearance

- dark green compound leaves with 7-11 leaflets
light gray, soft, corky young bark, scaly mature bark

Site & soils

- adapted to imperfectly drained soils, can tolerate some flooding. Needs full sun

Rural plantings

- reforestation Grows well with cedar, balsam fir, silver and red maple

Urban settings

- common urban tree, columnar form

Native to

- Ontario

Hackberry

Celtis occidentalis

15 metres
(50 feet)
100 years



**Bareroot
Seedlings**
2 years old



Appearance

- simple, bluish green leaves with elongated tip
Bark - gray to light yellow brown with warty irregular ridges

Site & soils

- adapted to a range of soils, moist or dry. Tolerates some shade.

Rural plantings

- reforestation, wildlife food source. Grows well with cedar, balsam fir, silver and red maple.

Urban settings

- small elm-like tree, tolerant of urban conditions

Native to

- southern and eastern Ontario

Appendix 1: Native Broadleaf Trees continued ...

White Elm

Ulmus americana

10-30 metres
(30-100 feet)
30-100 years



Bareroot Seedlings
1 year old
15+ cm tall



Appearance	<ul style="list-style-type: none"> • simple, toothed, dark green leaves; arching umbrella crown • gray brown furrowed bark - ash-grey with age
Site & soils	<ul style="list-style-type: none"> • adapted to a range of sites, tolerates moist sites. Moderately shade tolerant.
Rural plantings	<ul style="list-style-type: none"> • windbreaks, restoration, but can be short-lived due to Dutch elm disease
Urban settings	<ul style="list-style-type: none"> • tolerant of urban conditions, but short lived due to Dutch elm disease
Native to	<ul style="list-style-type: none"> • Ontario

Edible nuts

Black Walnut

Juglans nigra

30 metres
(100 feet)
100+ years



Bareroot seedlings
1 year old
15+ cm tall



Appearance	<ul style="list-style-type: none"> • yellow-green compound leaves with 14-22 leaflets • Light brown scaly young bark, dark broad ridges on mature bark
Site & soils	<ul style="list-style-type: none"> • best on deep well-drained fertile sites. Avoid dry sites. Needs full sun
Rural plantings	<ul style="list-style-type: none"> • reforestation, timber plantations, wildlife food source. Grows fast on good sites. Grows well with other broadleaf trees. Produces juglone which can be toxic to some tree species (pines).
Urban settings	<ul style="list-style-type: none"> • large, attractive ornamental for larger green spaces
Native to	<ul style="list-style-type: none"> • southwestern Ontario, becoming naturalized in eastern Ontario

Edible nuts

Butternut

Juglans cinerea

25 metres
(80 feet)
80 years



Bareroot Seedlings
1 year old
15+ cm tall



Appearance	<ul style="list-style-type: none"> • yellow-green compound leaves with 11-17 leaflets • Pale gray smooth young bark, pale gray, widely ridged mature bark
Site & soils	<ul style="list-style-type: none"> • best on well drained fertile loams; avoid drier & poorly drained conditions. Needs full sun.
Rural plantings	<ul style="list-style-type: none"> • reforestation, timber plantations, wildlife food source. Grows well with other broadleaf trees.
Urban settings	<ul style="list-style-type: none"> • large, attractive ornamental
Native to	<ul style="list-style-type: none"> • southern and eastern Ontario

Black Cherry

Prunus serotina

20+ metres
(65 feet)
80 years



Bareroot Seedlings
2 years old
15+ cm tall



Appearance	<ul style="list-style-type: none"> • simple, bright shiny green leaves • smooth dark young bark with dash like marks, dark, rough scaly mature bark
Site & soils	<ul style="list-style-type: none"> • adapted to a wide range of soils. Needs full sun.
Rural plantings	<ul style="list-style-type: none"> • reforestation, timber plantations, wildlife food source. Grows well with other broadleaf trees
Urban settings	<ul style="list-style-type: none"> • attractive, white spring flowers and dark scaly bark
Native to	<ul style="list-style-type: none"> • southern and eastern Ontario

White Birch

Betula papyrifera

25 metres
(80 feet)
80 years



Bareroot Seedlings
2 years old
15+ cm tall



Appearance	<ul style="list-style-type: none"> • simple, dull green, toothed leaves • Thin smooth dark red young bark, white papery mature bark
Site & soils	<ul style="list-style-type: none"> • adapted to a wide range of sites; needs full sun
Rural plantings	<ul style="list-style-type: none"> • reforestation Grows well with pines, spruce, poplar, balsam fir, yellow birch, sugar maple
Urban settings	<ul style="list-style-type: none"> • common urban tree
Native to	<ul style="list-style-type: none"> • Ontario

Ohio Buckeye

Aesculus glabra

15 metres
(50 feet)
80 years



Bareroot Seedlings
1 year old
12 - 20 cm tall



Appearance	<ul style="list-style-type: none"> • yellow green, palmately compound leaves with 5-7 leaflets • light gray young bark, rough dark brown, furrowed and scaly mature bark
Site & soils	<ul style="list-style-type: none"> • adapted to a wide range of soils, can tolerate some flooding
Rural plantings	<ul style="list-style-type: none"> • not recommended outside its native range
Urban settings	<ul style="list-style-type: none"> • showy late spring flowers
Native to	<ul style="list-style-type: none"> • southwestern Ontario, but has demonstrated some cold hardiness for areas beyond its natural range such as eastern Ontario.

Black Locust

Robinia pseudoacacia

25 metres
(80 feet)
90 years



Bareroot Seedlings
1 year old

Spreads readily by seed and root sprouts	
Appearance	<ul style="list-style-type: none"> • dull green, compound leaves with 7-19 leaflets, spiny twigs • smooth, brown young bark has spines, thick, brown, furrowed mature bark
Site & soils	<ul style="list-style-type: none"> • adapted to a wide range of soils, best in moist soils; needs full sun
Rural plantings	<ul style="list-style-type: none"> • site restoration (mine spoils, gravel pits), good species for honey production
Urban settings	<ul style="list-style-type: none"> • showy late spring flowers
Native to	<ul style="list-style-type: none"> • eastern USA, naturalized in southern and eastern Ontario

Appendix 1: Native Broadleaf Trees continued ...

Honey Locust

Gleditsia triacanthos

20 metres
(65 feet)
90 years



Bareroot Seedlings
1 year old
15+ cm tall



Appearance	<ul style="list-style-type: none"> bright green, compound leaves with 14-30 leaflets, spiny twigs smooth, brown young bark has spines, scaly-ridged mature bark
Site & soils	<ul style="list-style-type: none"> adapted to moist, rich bottomland soils, needs full sun
Rural plantings	<ul style="list-style-type: none"> not recommended
Urban settings	<ul style="list-style-type: none"> common ornamental, casts a light shade, tolerant of urban conditions
Native to	<ul style="list-style-type: none"> extreme southwestern end of Ontario

Exotic Broadleaf Trees

Horse Chestnut

Aesculus hippocastanum

25 metres
(80 feet)
100 years



Bareroot Seedlings
1 year old
12-20 cm tall

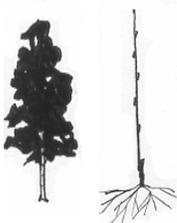


Appearance	<ul style="list-style-type: none"> yellow green, palmately compound leaves with 5-9 leaflets; green spiked husk on nuts; smooth dark gray young bark, fissured, scaly mature bark
Site & soils	<ul style="list-style-type: none"> best on well-drained deep soils
Rural plantings	<ul style="list-style-type: none"> not recommended
Urban settings	<ul style="list-style-type: none"> showy white flowers, tolerates urban conditions
Native to	<ul style="list-style-type: none"> southeastern Europe

Hybrid Poplar

Populus hybrids

25metres
(80 feet)
40 years



Bareroot Seedlings
1 year old
100 cm tall



Appearance	<ul style="list-style-type: none"> simple, dark green leaves Smooth green young bark, light yellow gray, rough mature bark
Site & soils	<ul style="list-style-type: none"> best on moist to well drained loams.
Rural plantings	<ul style="list-style-type: none"> plantations for pulp. Grows very fast, but is short-lived
Urban settings	<ul style="list-style-type: none"> windbreaks, screens
Native to	<ul style="list-style-type: none"> Ontario and Europe (hybrids of poplars from both areas)

Native Small Trees & Shrubs

Juneberry

Amelanchier species

5-10 metres
(15-30 feet)



Bareroot Seedlings

2 years old
15 + cm tall



Edible fruit

Appearance	<ul style="list-style-type: none"> small tree; simple green leaves, smooth, gray young bark marked by vertical lines, rough, scaly mature bark
Site & soils	<ul style="list-style-type: none"> adapted to a wide variety of sites - best in moist to dry sites. Tolerates some shade. Best in full sun
Rural plantings	<ul style="list-style-type: none"> reforestation, wildlife food source
Urban settings	<ul style="list-style-type: none"> showy white flowers, small shrubby or tree form
Native to	<ul style="list-style-type: none"> Ontario

Red Elderberry

Sambucus pubens

4 metres
(15 feet)



Bareroot Seedlings

2 years old
15 + cm tall



Appearance	<ul style="list-style-type: none"> large shrub or shrubby tree; compound leaves with 5- 7 leaflets, plump red buds. Warty gray-brown mature bark
Site & soils	<ul style="list-style-type: none"> adapted to a wide range of soils, best in moist soils. Best in full sun
Rural plantings	<ul style="list-style-type: none"> reforestation, wildlife food source
Urban settings	<ul style="list-style-type: none"> white late spring flowers, tolerant of air pollution
Native to	<ul style="list-style-type: none"> Ontario

Black Elderberry

Sambucus canadensis

3 metres
(10 feet)



Bareroot Seedlings

2 years old
15 + cm tall



Edible autumn fruit

Appearance	<ul style="list-style-type: none"> large shrub or shrubby tree; compound leaves with 5-11 leaflets Warty gray-brown mature bark
Site & soils	<ul style="list-style-type: none"> adapted to low ground sites; tolerates some shade - best in full sun
Rural plantings	<ul style="list-style-type: none"> reforestation, wildlife food source
Urban settings	<ul style="list-style-type: none"> fragrant, white early summer flowers, small shrubby tree form
Native to	<ul style="list-style-type: none"> Ontario

Pin Cherry

Prunus pensylvanica

10 metres
(30 feet)
40 yrs



Bareroot Seedlings

2 years old
15 + cm tall



Appearance	<ul style="list-style-type: none"> small tree; simple leaf with a tapered tip; smooth dark reddish young bark; mature bark has horizontal papery strips
Site & soils	<ul style="list-style-type: none"> adapted to many sites; needs full sun
Rural plantings	<ul style="list-style-type: none"> reforestation, wildlife food source
Urban settings	<ul style="list-style-type: none"> white spring flowers, small tree form
Native to	<ul style="list-style-type: none"> Ontario

Appendix 1: Native Small Trees & Shrubs continued ...

Wild Plum

Edible late summer fruit

Prunus nigra

9 metres
(30 feet)



**Bareroot
Seedlings**



1 year
old
15+ cm
tall

Appearance

- small tree; simple leaf with a tapered tip, thorny twigs smooth, dark brown young bark with thorns; mature bark is scaly

Site & soils

- best on moist loam soils; Needs full sun

Rural plantings

- reforestation, wildlife food source

Urban settings

- white, then pink spring flowers, small tree form

Native to

- southern and eastern Ontario

Willow

Salix species



Shrub and tree forms

**Bareroot
Seedlings**



1 years old
30+ cm tall

Appearance

- large shrub to large tree forms; simple green leaves smooth, gray young bark; rough, furrowed mature bark

Site & soils

- adapted to many sites. Tolerates flooded conditions. Needs full sun

Rural plantings

- site restoration, wildlife cover.

Urban settings

- small shrubby or small tree form

Native to

- Ontario

Nannyberry

*Viburnum
lentago*

5 metres
(15 feet)



**Bareroot
Seedlings**



3 years
old
30 + cm
tall

Appearance

- large shrub or small tree, simple yellow-green leaves, blue-black fall berries, gray-brown, fine scaly mature bark

Site & soils

- adapted to a wide range of soils, best in moist soils. Best in full sun. Tolerates some shade.

Rural plantings

- restoration, wildlife food source

Urban settings

- white late spring flowers, shrub or small tree form

Native to

- Ontario

Highbush Cranberry

*Viburnum
trilobum*

3 metres
(10 feet)



**Bareroot
Seedlings**



3 years
old
30 cm
tall

Appearance

- large shrub; lobed maple-like leaves; Smooth wiry branches, rougher mature bark

Site & soils

- adapted to moist sites; Best in full sun

Rural plantings

- restoration, wildlife food source

Urban settings

- white spring flowers, red berries, shrub form

Native to

- Ontario

Red Osier Dogwood

*Cornus
stolonifera*

2-3 metres
(6 - 10 feet)



**Bareroot
Seedlings**



2 years
old
15 + cm
tall

Appearance

- low shrub; simple leaf, smooth red bark, bluish white fall berries

Site & soils

- damp lowland sites. Needs full sun

Rural plantings

- restoration, wildlife food source

Urban settings

- white spring flowers, small shrub, bright red winter stems

Native to

- Ontario

**Alternate Leaf
Dogwood**

*Cornus
alternifolia*

10 metres
40 years



**Bareroot
Seedlings**



2 years
old
15 + cm
tall

Appearance

- simple, smooth margined leaf Thin reddish brown young bark; mature bark with shallow ridges

Site & soils

- best on moist loam soils; tolerates shading

Rural plantings

- site restoration (roots readily to stabilize soils), wildlife food source

Urban settings

- white spring flowers, small tree form with flat layered branching

Native to

- southern and eastern Ontario

Gray Dogwood

*Cornus
racemosa*

2 - 3 metres
(6 to 10 feet)



**Bareroot
Seedlings**



2 years
old
15 + cm
tall

Appearance

- large shrub; simple, smooth margined leaf, white August berries. Thin reddish brown young bark; mature bark with shallow ridges

Site & soils

- best on moist loam soils; tolerates shading, best In full sun.

Rural plantings

- reforestation, wildlife food source

Urban settings

- white spring flowers, small tree form with flat layered branching

Native to

- southern and eastern Ontario

APPENDIX 2 PROJECT PARTNERS



275 County Rd. 44
R.R.#4 Kemptville, Ontario
K0G 1J0

Phone: (613)-258-0110
1-888-791-1103
Fax: (613)-258-0207

Email:
info@seedlingnursery.com
Web: www.seedlingnursery.com



Suite 233, 266 Charlotte St.
Peterborough, Ontario
K9V 2V4

Phone: (705) 755-3284
Fax: (705) 755-3292

Email:
barb.boysen@mnr.gov.on.ca
Web: www.fgca.net



P.O. BAG 2111
Kemptville, Ontario
K0G 1J0

Phone: (613) 258-8241
Fax: (613) 258-8363

Email: modelforest@eomf.on.ca
Web: www.eomf.on.ca

Other Help

There are several other agencies and organizations offering assistance to landowners interested in planting tree. In addition, the Internet can provide valuable information although landowners are cautioned to ensure that any advice is pertinent to there area.

Agency	How to Contact Them	Services Provided
Conservation Authorities	check your local blue pages	Tree planting programs; planting advice
Ontario Ministry of Natural Resources	Kemptville District Office (613) 258-8204	Planting advice
Local Stewardship Councils	contact OMNR or on the web at www.ontariostewardship.org	Stewardship programs, contact information
Landowner Resource Centre	(613) 692-2390	Extension information