

Butternut Monitoring and Conservation Program

The butternut tree (*Juglans cinerea*) is a nut-bearing tree that grows in eastern North America, which includes southern Ontario, Quebec and parts of New Brunswick. Butternut is also known as white walnut, oil nut and lemon nut because of its light-coloured wood and the oily nuts it produces. These oily, edible nuts are favoured by birds, squirrels, rabbits, and other small mammals as a source of food.



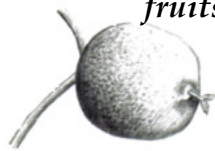
Historically, Aboriginal people used the nut oil for cooking, hair dressing and leather-making; the husks of the nut were used to make a yellow-brown dye for the uniforms of the American Confederate army, and fishermen would stun fish by throwing its bark in small streams. The wood is used by carvers and wood workers because of its workability and its aesthetics.

The butternut is a short-lived tree, not usually exceeding 80 years of age. It is medium-sized, growing to around 25 meters (80 feet) tall and 75 cm in diameter. It is a shade-intolerant species, meaning it needs good exposure to sun to grow and reproduce. They are often found growing in open fields and along fence lines, as well as within mixed hardwood stands, either scattered individually or in small groups.

Butternut fruits are oval and sticky



Black walnut fruits are round



Nut of butternuts nuts have jagged ridges

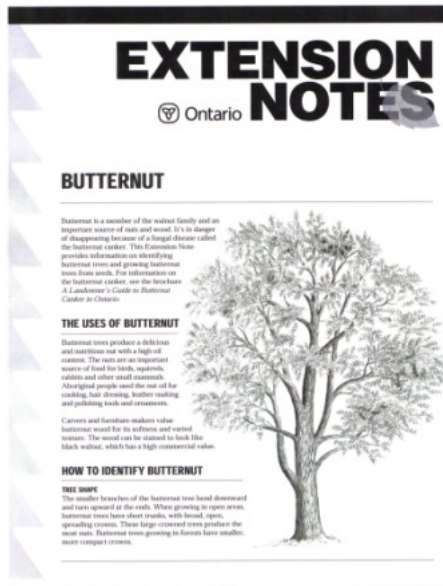


Black walnuts nuts have rounded ridges



Black walnuts and butternuts are similar in appearance and are often confused. A good description of butternut and how to distinguish them from black walnut can be found by following this link:

http://www.lrconline.com/EN_splash.html Landowner Resource Centre website has a butternut Extension Note.

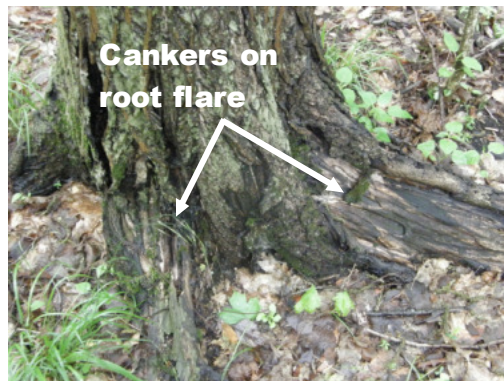


Currently in Ontario, the butternut is designated as an Endangered Species under the Provincial Endangered Species Act, and is listed as a Nationally Endangered Species by the Canadian Wildlife Service. This means the butternut is at risk of becoming extirpated (not existing in the wild in Canada, but existing elsewhere), or worse yet, extinct.

The Butternut is in danger of disappearing due to a fungal disease commonly called butternut canker (*Sirococcus clavignenti-juglandacearum*). The fungus can infect and kill healthy trees of all ages and sizes as well as stressed or injured trees. The disease has been

found in ninety percent of the examined butternuts in Ontario.

The origin of the fungus is unknown, but genetic evidence suggests that it is an introduced species (A. Ross-Davis et al. 2008).



Infection with butternut canker usually occurs through buds, insect wounds or other openings in the bark. Over time, the disease kills patches of the bark in areas known as cankers. These cankers will eventually encircle branches and stems and cut off the flow of water and nutrients within the tree, thus girdling and killing the tree. It is believed that infection begins in the lower crown, and moves to the stem of the tree by rain splash. The fungus can also affect the nuts, leaving black sooty marks on the husks. There is no hard-fast rule as to how long a butternut can live after infection with the fungus. This depends on the size and vigour of the tree, and possibly its genetic composition.

It is uncertain how the fungus is dispersed, though it is thought that some beetles can carry it from tree to tree on their feet. It has also been suggested that the fungus can be spread in water droplets or in aerosols when it rains, and remain viable in air for at least eight hours, allowing them to travel a kilometre or more in light wind (N. Tisserat and J.E. Kuntz, 1984).

Common signs of butternut canker include:

- Dead or dying branches in the upper crown
- Epicormic branching (formation of shoots) below the dead or infected area
- Black fluid exuding from cracks in the bark in the spring
- In summer, fall and winter the black fluid dries to a sooty stain
- Underneath the bark cankers appear as sunken, diamond-shaped features, dark brown to black in colour



A butternut monitoring and recovery program began in the fall of 2007 by the Ontario Stewardship Councils of Simcoe and Dufferin Counties, and the Regional Municipalities of York and Halton-Peel. Much of the early efforts went into educating landowners and public groups about the plight of the butternut. In partnership with many other community and professional groups, as well as over 60 concerned landowners and community forest managers the monitoring program is well on its way. This program is part of a larger recovery effort across north eastern and north central North America to try to save the butternut species.



**Assessing
butternut health**

The aim of the butternut program is two-fold. The first is to identify retainable trees using Ostry's guidelines to be used for long-term monitoring and for research, specifically, to gain an understanding of the relationship between the trees' genetics and resistance to the fungus. An explanation of Ostry's guideline will follow. The second aim, and no less important, is to identify potential seed-bearing trees to support a nursery stock out-planting program. To do this, work has begun to locate and map mature, healthy butternut which will allow for the forecast of seed production. The trees will be monitored using tree health indicators and seed will be collected each fall. These

seeds will be treated at the Ministry of Natural Resources Tree Seed Plant; they will germinate and with the help of Somerville Nurseries, will then be used to produce butternut seedlings.



These seedlings will be planted on site-appropriate locations throughout the recovery program area. The hope is that these trees are of superior stock, and may display a resistance to the attack of the canker and, in the future, repopulate our landscapes with beautiful, healthy butternut trees.

Research is already being done to ensure these efforts are not in vain. The Forest Gene Conservation Association (FGCA) is taking action to identify trees with a potential resistance to the canker. These trees will then be archived and grafted for future disease resistance screening work. A long-term conservation strategy for butternut in southern Ontario is also being developed. To find out more about the work being done by the Forest Gene Conservation Association, or to help contribute, please follow this link: www.fgca.net

In the future, the butternut program plans to expand to include silvicultural treatments that will promote butternut health. Some genetic testing will be done to investigate hybridization as well as the possibility of a resistant gene. It is hoped that through the support of communities, landowners and various organizations that these efforts will continue to contribute to the butternut tree's existence in Ontario for many generations to come.

For more information on the butternut, and Butternut Recovery Program please follow these links:

http://www.ontariostewardship.org/councils/halton-peel/files/butternut_brochure_2009.pdf

Landowners have been critical in the butternut monitoring and recovery program. If you have a butternut on your property, and would like to get involved in the recovery efforts, please contact the appropriate representative in your area.

- Dufferin County - John Osmok, Land Stewardship Network of Dufferin & South Simcoe, Ministry of Natural Resources, Midhurst District
Tel.: 705-725-7561, Email: john.osmok@ontario.ca
- Simcoe County - Al Winters, North Simcoe Private Land Stewardship Network, Ministry of Natural Resources, Midhurst District
Tel.: 705-725-7557, Email: al.winters@ontario.ca

- Halton-Peel Regions - Greg Bales, Halton-Peel Woodlands and Wildlife Stewardship, Ministry of Natural Resources, Aurora District
Tel.: 905-713-7410, Email: greg.bales@ontario.ca
- York Region - Brian Peterkin, York Environmental Stewardship, Ministry of Natural Resources, Aurora District
Tel.: 905-713-7732, Email: brian.peterkin@ontario.ca
- Outside these areas contact Barb Boysen at the Forest Gene Conservation Association, Tel.: 705-755-3284, Fax.: 705-755-3292,
Email: barb.boysen@ontario.ca Website: www.fgca.net

After being contacted by the landowner, a field survey is done to assess the health of the butternut trees. It is from these assessments that trees will be selected for further monitoring and possibly seed collection and genetic testing.

Butternut Health Assessment Survey

A survey is done to assess each tree that is reported to the Recovery Program. This survey follows the guidelines set forth by the Forest Gene Conservation Association in the *Butternut Health Assessment in Ontario* manual.

The ultimate goal of these surveys is to find 'retainable' butternut trees. Retainable trees are trees that meet the research-based criteria which indicate the butternut may be defending itself against butternut canker. This could imply that the tree has a possible genetic variation that gives it an advantage over other butternuts. Finding these trees is essential to further research and recovery of the butternut species.

The survey has three main components. The first is an overall site description including land type and vegetation community (ex. urban yard or deciduous forest) as well as a complete tally of all the butternut trees, dead or alive on the site property, and their diameter class.

The second component of the survey deals specifically with trees that might be retainable. These trees must be at least ten centimetres in diameter and have a fifty percent or greater live crown and only minor stem cankers. More detailed information is recorded about each tree in this section, as well as more specific site location data. Survey information in this section includes: crown class (based on how many sides of the crown are exposed to the sun), crown vigour (classification based on the health of the crown), seed signs (noting male and female flowers and developing seed), number of stems and length of stem below live crown, bark type, as well as soil type, depth and

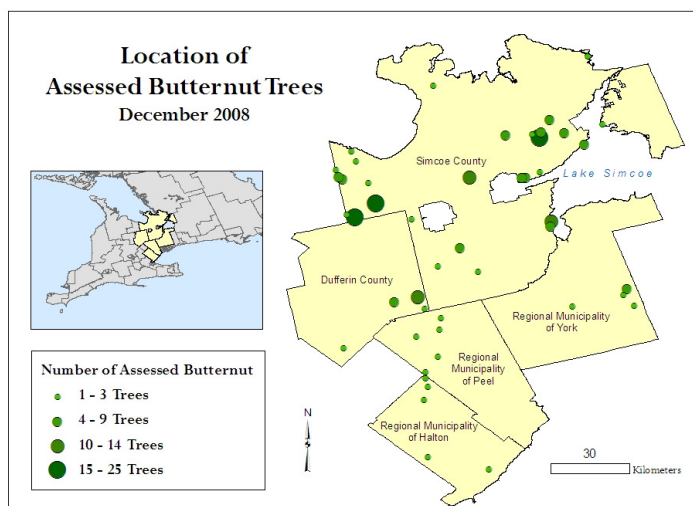
drainage capabilities. Photos of these trees are taken, and their location is recorded with a GPS unit.

Another very important component of assessment is in looking for signs of the canker itself. These include epicormic branching (the formation of shoots in abnormal places), branch dieback in the living crown, calloused wounds, sooty patches (a soot-like mark on the bark of the tree made by the fungus), and open cankers (areas where bark has been loosened, revealing a dark brown to black mark on the tree, usually elliptical in shape, and often exuding a black oozing liquid). These signs and their frequency are recorded for each tree.

These last components are used in determining whether or not the tree is retainable based on Michael Ostry's 70-20-50 guideline. This guideline requires that the tree be greater than 10 cm in diameter at breast height and meet one of these two criteria:

- 1) have more than 70% live crown, and less than 20% of the combined circumference of the main stem and root flare affected by canker or
- 2) have at least 50% live crown, and no cankers visible on the main stem or root flares.

The map below displays the location and distribution of the assessed trees as of December 2008 for the program area. The larger points indicate a higher number of assessed trees. Not all of the assessed trees are displayed on the map. Only the trees with a GPS coordinate recorded for their position were included.



Summary of butternut trees assessed by Region/County

Simcoe and Dufferin

To date, in Simcoe County approximately 460 butternut trees have been assessed from 42 sites. Of these, 82 will be monitored for health and seed production, and 49 are 'retainable' according to the Ostry guidelines. In 277 trees the disease is too far along for our monitoring purposes. The rest are dead.

The assessed trees have been found in the horseshoe moraines, along the Niagara escarpment, and in the Simcoe uplands and lowlands, along the shores of Lake Simcoe.



**Healthy
Butternut tree**

Halton-Peel Region

To date, in the Halton-Peel Region, approximately 25 butternut trees have been assessed from 6 sites. Of these, 5 will be monitored for health and seed production, and 3 are 'retainable' according to the Ostry guidelines. In 8 trees the disease is too far along for our monitoring purposes. The rest are dead.

The assessed trees have been found on the Oak Ridges Moraine, and the Niagara escarpment.

York Region

To date in York Region 13 butternut trees have been assessed from 4 sites. Of these, 2 will be monitored for health and seed production, and 6 are 'retainable' according to the Ostry guidelines. In 5 trees the disease is too far along for our monitoring purposes. There were no dead butternuts recorded at the four sites.

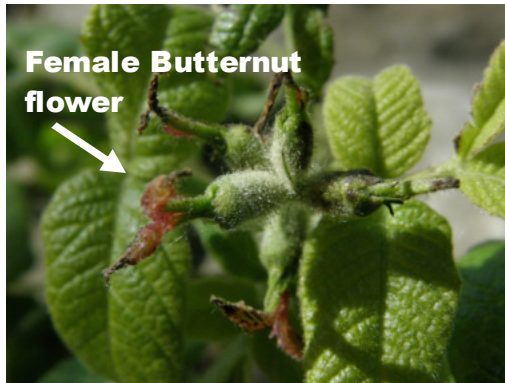


**Butternut
terminal bud
& leaf scar**

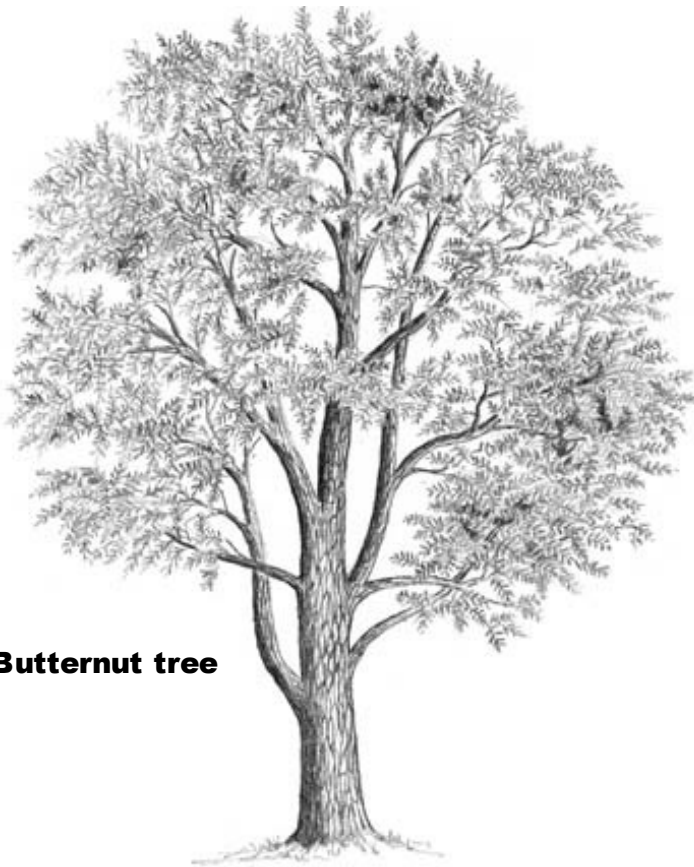
Assessments in York Region have been limited to date, however butternut trees have been assessed on the Oak Ridges Moraine, and South slope areas.

Grey-Bruce

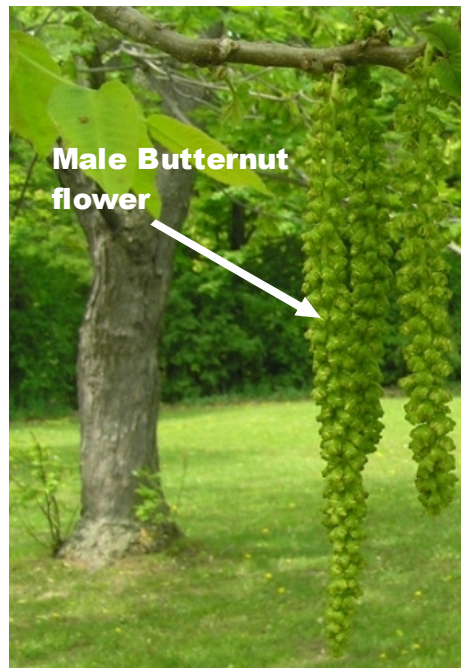
Limited survey efforts have also been carried out in the counties of Grey and Bruce with success. Four sites have been visited yielding 5 trees appropriate for seed and health monitoring, and 2 trees fitting the Ostry guidelines for 'retainable'. It is very hopeful that the program will expand in the near future to encompass these areas.



Female Butternut flower



Butternut tree



Male Butternut flower

Assistance for this project was provided by the Ministry of Natural Resources – Species-at-Risk Stewardship Program and Environment Canada – Habitat Stewardship Fund.