

Canadian Chestnut Council (CCC)

...on the Chestnut Trail

NEWSLETTER # 35

September 2004

<http://www.uoguelph.ca/~chestnut>

In this issue: - Progress Report - CCC History - Annual Meetings - Chestnut Family Tree - and more!

Phase I Completed



Dragan Galic sprays low-pH nutrients on planted seedlings at Onondaga Farms, July 2004.

Letters from Members

"I have a Canadian Chestnut you have bagged the last two years." - J. Cumming, Blenheim, ON.

"I read the newsletter from C.C.C. over many times. I sure appreciate the work you people are doing re: American Chestnut survival!" - O. Grundmann, Terrace, BC.

"Congratulations on your best ever newsletter (April 04)!" - R.Craig, Kingston, ON. [Ed: Aw, shucks.]

"Always interested. I have a planting of 50 trees in 2001 - doing fairly well after very dry year in 2003." - J.Hickson, Wheatley, ON.

"I have 7 or 8 saplings that have come through two winters - 2 labelled 'mother.'" - F. Flood, Milton, ON.

756 Seedlings Planted in 2 Sites. 1000 Seedlings to be Planted in 2005.

The first phase of the CCC's restoration program for the American chestnut in Canada has been completed.

756 tree seedlings have been planted in our two field sites, at Onondaga Farms and Riverbend Farms. Of these, 152 are Backcross 4 (BC4) hybrids and 125 are BC3 hybrids.

Another 449 are native chestnuts, and 30 are European and Chinese chestnuts with grafted Canadian stock. The former will be used as native gene stock to facilitate crossbreeding in future. The foreign tree seedlings are an experiment to provide low-growing trees, upon which native flowers will grow at easily reached height for future pollinations. The concentration of trees in the two farm sites will greatly reduce travel time for future pollinations.

Between 1,000 and 1,200 seedlings remain in the Simcoe Research Station greenhouses, where they will overwinter. In Spring 2005, as soon as the ground thaws, they will be planted at the two farm sites.

In summary, about 600 hybrid seedlings will grow in each of the field sites next summer.

The latest Board of Directors meeting, held on 11 September, was devoted to planning for the next phases, and in particular to estimating costs of Phase II. The results will be presented at the Annual General Meeting on 30 October, at Onondaga Farms. - C Hooker

EDITORIALS

He who plants trees loves others besides himself.

- Thomas Fuller (1654-1734).

The late Andrew Dixon said, "We have tended to think of our forests as naturally recurring resources and treated them as such, using up their products as we need them...It is time we changed our thinking."

Mr. Dixon grew trees all his life and was able to study methods and profitability despite the lengthy time trees take to grow. In 1990 he reported that a 70-year-old black walnut tree 30 inches in diameter was worth about \$1,500 on the stump. Based on this and other data, he calculated the annual growth in value of various trees.

Per acre, a black walnut forest should earn over \$600 per year over its growing lifetime. White pine, which can mature for harvest in 35 years, can earn almost \$900 per year. Even poplar (used for pulpwood), maturing in 20 years, grows in value at over \$600 per year per acre. And these are 1990 figures.

If you have an empty piece of land, however small, plant trees and will the land to someone who will continue your work. Your grandchildren will be grateful, the nation will enjoy the enriched air and environment, and you will have struck a blow for Nature.

The Canadian Chestnut Council

The CCC is a scientific and charitable organization with the mission to restore the American chestnut. All its officers volunteer their services both in the field and at the desk. The CCC annual meeting, the web site and this Newsletter dispense information to generate support for saving and restoring this once-important forest tree.

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OTF Visits CCC

Ms. Nuala Doherty, the agent for our Ontario Trillium Foundation (OTF) grant, recently accepted Dr. Colin McKeen's invitation to the Onondaga Farms site, near St. George, Ontario. Here she met Mr. Gil Henderson, the owner who deeded his farm to the Tim Horton Children's Foundation, and walked the rows of well-tended hybrid American chestnuts.

After a lunch at Mr. Henderson's home, Dr. McKeen took Ms. Doherty to the University of Guelph Simcoe Research Station to examine our seedlings there.



Mr. Gil Henderson, Ms. Nuala Doherty and Dr. Colin McKeen at the CCC tree site, Onondaga Farms

A Brief History of the Canadian Chestnut Council (CCC)

(Excerpt of a report presented by Dr. C. McKeen during the 17 April meeting of the Board of Directors)

The Blight

The early history of the devastating chestnut blight is well known. Numerous attempts to bring the blight under control and effect a full recovery of the American chestnut over the last 60 or more years in the US and Canada resulted in failure.

Events Leading to CCC Formation

Dr. McKeen started research on chestnut blight in 1983, when he joined US colleagues in the NE-140 Research Project nearly fifty years after he had first seen evidence of the blight in southern Ontario. In October 1987, at the end of a second public meeting on the chestnut blight status held at the University of Guelph Arboretum, the Canadian Chestnut Council (CCC) was formed. There was some evidence for a comeback of the American chestnut, and enthusiasm was generated for an attack on the blight. In 1993, the CCC became a registered, non-profit, charitable organization in Canada with its own constitution and bylaws. Published newsletters and public annual meetings kept chestnut enthusiasts interested. A board of directors was set up to administer the research, publicity and other important aspects of the program.

Research on Hypovirulence

Hypovirulence is the name for a debilitated expression of the disease. It results from infection of the virulent fungus with a virus. The virus lives in the fungus and spreads from tree to tree with the disease. Hypovirulence was first observed in Italy in the early 1950s, where it was seen to bring about a good measure of blight control and appeared to spread naturally. The mechanism behaved differently in the US and Ontario: its spread was limited. To test hypovirulence as a biocontrol mechanism, much research was conducted at several centres in the eastern US, but many of the desired results did not materialize.

In Canada during the nineties, funds were obtained from World Wildlife (Canada), the Ontario Ministry of Natural Resources (OMNR), Ontario Forestry Research Institute (OFRI) and National Science and Engineering Research Council (NSERC) to support the hypovirulence research program of Dr. Greg Boland and his graduate students at the University of Guelph. In Ontario, field results were not encouraging for using hypovirulence as a biocontrol mechanism. Because of these unfavourable results, the program was ripe for de-emphasis. Breeding for blight

resistance, although a long-term and tedious program, appeared to offer much greater promise of blight control.

Breeding Program Initiation

In 1998, CCC directors agreed to start a blight resistance breeding program similar to that in the US. The backcross breeding program undertaken by the American Chestnut Foundation (TACF) in 1991 was a restart of a previous program discontinued in the 1950s. Errors in the earlier program were corrected.

In 1999, Dr. Adam Dale, of the Department of Plant Agriculture, Simcoe Research Station, University of Guelph, was named as CCC plant breeder. A breeding plan was designed and agreed upon, similar to the TACF plan centred at Meadowview, Virginia.

Rather than starting from scratch, CCC agreed to try to acquire germplasm of restricted advanced breeding lines from the US. Since a CCC committee did not agree with TACF's germplasm agreement, pollen from Meadowview via Dr. F. Hebard was declined. Dr. S. Anagnostakis, Connecticut Agriculture Experimental Station, volunteered pollen from Connecticut's advanced breeding lines without any restrictions. CCC accepted her offer. Plans were made to apply the Connecticut pollen to a minimum of ten



Mike Nemerowski, Arthur Langford and Colin McKeen - April Directors' Meeting

“mother” trees in southern Ontario. Pollen from three advanced breeding lines was brought into Ontario by Dr. Dale, and distributed to directors and other volunteers to be applied to native chestnut trees in Essex, Kent, Elgin, Norfolk, Halton and Dufferin Counties in 2001-2003.

The program has yielded more than 1200 hybrid nuts representing Backcross 3 and 4 (BC3 and BC4) generations.

Problems and Solutions

The question arose whether to direct-seed into the field nurseries at Onondaga and Riverbend Farms or to start with a greenhouse culture. Each of the two methods appeared to offer distinct potential advantages and

difficulties. Developing a satisfactory greenhouse growth culture to meet the needs of chestnut seedlings has caused other problems that may be overcome in 2004 operations.

Results of both methods will be available for study after 2004. Supreme efforts are being made to keep to the allotted time schedule. All hybrid seedlings should be established in the field nurseries by 2005.

Subsequent phases of the plan will involve nurturing the planted trees to a suitable size to permit testing for blight resistance and accordingly make appropriate selections in readiness for the intercrossing program. - CD McKeen

CCC Annual Meeting

The CCC Annual General Meeting will be held at the Tim Horton Children's Foundation camp at Onondaga Farms, near St. George, Ontario, on Saturday, October 30, 2004, 10:00 am-4:30 pm..

The meeting will be held in the Observatory Building - the one with the telescope dome.

Onondaga Farm is on the Glen Morris Road East, about 1-2 kilometers east of Highway 24 and just northwest of St. George. A large entrance gate on the south side of the Glen Morris Road makes the farm clearly conspicuous.

Agenda

- 10:00-11:15 - Registration and tour of the blight-resistant breeding nursery
- 11:20-12:00 - Public business session
- 12:00-1:15 - Lunch (\$12.00 per person)
- 1:30-2:45 - Guest speaker: Dr. Mark Double, West Virginia University
- 2:45-3:00 - Break (refreshments)
- 3:00-3:25 - Dr. Adam Dale, Simcoe Research Station, University of Guelph
- 3:25-4:30 - Questions and Answers

Details

Our guest speaker, Dr. Mark Double, is a research scientist who for twenty years has conducted research on chestnut blight in the state of West Virginia. He is well qualified to report the progress on chestnut restoration in the United States.

Dr. Dale laid out the guidelines for the CCC blight resistance breeding program. He will report CCC progress achieved to date.

Come early (10:00 am) to see the nursery plot containing the Backcross 3 hybrid seedlings, etc. Care of the plot has been in the hands of Mr. John Hill, Manager of Onondaga Farms, who supervises the many camp volunteers who have helped water, fertilize and generally care for the trees.

The Tim Horton Children's Camp Foundation site is a beautiful setting, and gives us a wonderful feeling of success.

Some of our members have furniture, knick-knacks, ornaments and general handiwork made of chestnut wood. We invite you to bring them to the meeting for display.

Be prepared to enjoy a great adventure: see what our chestnut volunteers have achieved. - Dr. CD McKeen



Erratum

As many readers doubtless observed, the tree pictured on the first page of the April Newsletter is not quite so large as the caption suggested.

It has a *circumference* (not a diameter) of 212 cm (85 inches). Its diameter is therefore 67.5 cm (26.9 inches).

TACF Annual Meeting

The American Chestnut Foundation (TACF) will hold its annual meeting in Asheville, North Carolina October 29 and 30, 2004. Anyone interested in chestnut preservation is welcome to attend.

More details can be obtained by writing to TACF, 469 Main Street, P.O. Box 4044, Bennington, Vermont, USA 05201-4044.

- CD McKeen

The Family Tree of the Hybrid Chestnut

Hybrid breeding terminology can be confusing. Recently the American Chestnut Foundation (TACF) newsletter "The Bark" published a chart that clarifies matters. A similar chart, updated for Canadian purposes, may be helpful to readers.

Hybridizing the American chestnut begins with one Chinese tree and one American chestnut tree.

This first *forward*-hybrid cross, crossing an American chestnut with a Chinese chestnut, is designated the F1, and produces a tree that is 50% American and 50% Chinese.

When the pollen from an F1 tree is applied *back* to the flower of a native American chestnut, a Backcross-1 (BC1) nut is bred that is 75% American, 25% Chinese.

Not all crosses breed true; a range of hybrid tree varieties will grow. The breeder selects those trees that are closest to 50% Chinese, 50% American for subsequent hybridizing.

Backcrossing a BC1 and a native American tree yields a BC2 (87.5% native). Subsequent crosses to a native tree produce a BC3 (94%), BC4 (97%), etc. In each case a hybrid is crossed *back* to an American chestnut.

The trees now being planted at Onondaga and Riverbend Farms are BC3 and BC4 hybrids. The BC4 hybrids arise from pollen from the R2T8 and R2T10 trees in Connecticut, which are BC3 trees. The BC3 trees resulted from pollen from "Sandy's Tree," a BC2 tree that stands on the property of Dr. Sandy Anagnostakis in Connecticut.

Once the current generation of trees has grown for about three to five years, blight will be injected into them and the resulting blight cankers will be measured to determine the trees' resistance to the disease.

Resistant trees with the best American characteristics (height, stature, bark colour, leaves, etc) will be selected for hybridizing within their numbers: no other trees or pollen will be involved. This intercrossing will reinforce the resistance while maintaining the American-chestnut stature of subsequent tree generations. The designation used to represent this first intercross of resistant trees is BC3F2.

The goal of the CCC is to continue crossbreeding to attain a BC4F3, two generations after the present one. Those trees should offer a 97%-pure American chestnut with full blight resistance. - C Hooker

With each backcross, additional American chestnut characteristics are regained. Only at the intercross, however, is blight resistance equal to that of the Chinese parent again restored.

100% Chinese x 100% American



F1 (50%C-50%A)

F1 x American



BC1 (25%C-75%A)

BC1 x American



BC2 (12.5%C-87.5%A)

BC2 x American



BC3 (6%C-94%A)

BC3 x American



BC4 (3%C-97%A)

BC4 x BC4



BC4F2 (3%C-97%A)

BC4F2 x BC4F2



BC4F3 (3%C-97%A)

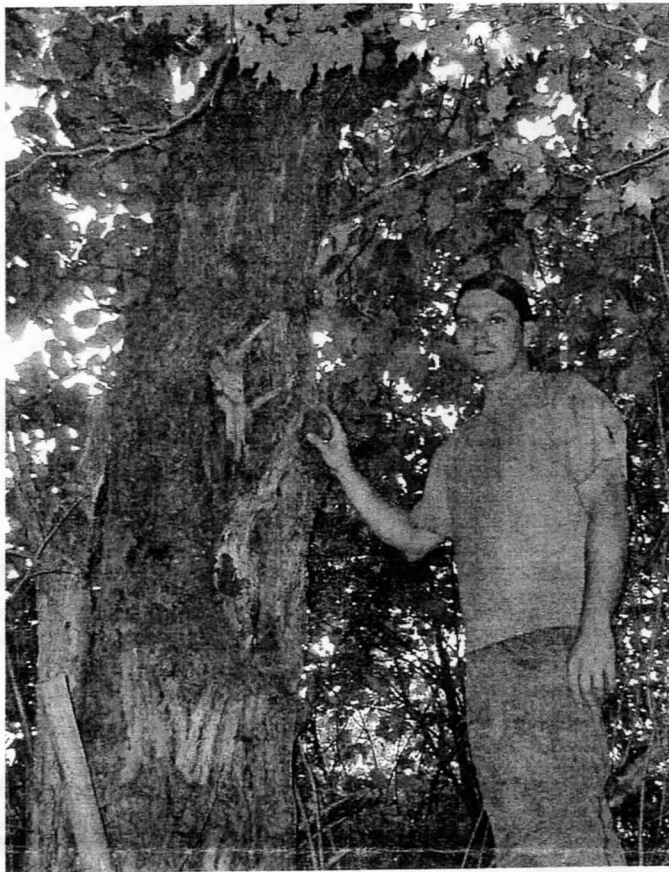
Meet the Directors

Brett Hodgson is a young (29 years) resident of Norfolk County. He graduated as a Fish and Wildlife Technician from Sir Sanford College, avidly fishes and hunts, and presently works in the family business as a licensed G1 Gas Technician. His hobby is growing trees. His work as a CCC director has been mainly in the field, pollinating and harvesting chestnuts with great enthusiasm.

Brett lives and breathes American chestnuts. He first encountered them in a forest near his childhood home, where "oodles of spiky toys" littered the ground. In his teenage years he thoroughly searched Middletown Township (Norfolk County), finding many living chestnut trees in several woodlots and carting home a variety of rocks, flints and sometimes chestnuts.

At college Brett learned formally about the American chestnut blight and protested when his instructor stated categorically that no more American chestnut trees existed.

He had found, and continues to find, hundreds of trees. He has created a planting site of American chestnut, now



containing over 60 trees from 15 different sources, in an effort to preserve genetic diversity. "They lurk in the shadows of their former kingdom, humbled by the ferocity of their enemy but surviving on the hope that one day they will be able to trade genetic strategy and evolve a defence. I cannot," says Brett, "think of a more versatile tree, a true provider of life."

Why is chestnut such an addiction? Brett believes that the chestnut story is a perfect example of the consequences of humans' manipulation of our fragile environment, and how easily it is done. At the same time, the tree can demonstrate the possibility of reversing man's mistakes.

"This is a model for hope, not only for the chestnut's survival but also for our own. Chestnut is an amazing survivor despite its enemy, and accepts our helping hand

to become a certain and staple part of our unique rural Ontario landscape."

- C Hooker

Director News

Since the last annual general meeting, the directors have met seven times and will meet again before the next general meeting. It has been an unusually busy year, as the field work of pollinating trees came to an end (for Phase 1), the Ontario Trillium Foundation grant terminated after its three-year run, and new directions were planned for the CCC.

Mr. Mike Nemerowski installed an irrigation system at Riverbend Farms, aided (and preserved in print) by volunteer photographer Mr. Wes Horley. Mike has also been engaged in recording the lessons learned over the past several years on how to grow, and how not to grow, American chestnuts.

A record number of nuts was planted in the Simcoe Research Station greenhouses, producing more than 1,000 chestnut seedlings for 2005 planting at field sites.

Dr. Terry Anderson compiled a new estimate of future costs, and began the process of seeking a new Ontario Trillium Foundation grant to address needs over the next three years.

- C Hooker

Director Elections in October

The goal of a blight-resistant American chestnut tree will take time and patience, and older directors of the CCC may not be around to celebrate success. Younger directors are needed, with lots of patience, to sustain the work of the CCC.

Each year one-third of the directors must stand for re-election. This year, Mr. Mike Nemerowski, Mr. Charles Hooker, Mr. Doug McKeen and Mr. Doug Campbell complete their three-year terms and must seek re-election. Mr. Tom Welacky has agreed to stand for election as a new director.

Members are encouraged to nominate candidates who are willing to carry on the work of the Board of Directors: attending about six meetings a year, deciding the course of activities and field operations and in most cases carrying out the actual field, office and executive duties.

If at all possible, please notify a member of the Board of your intention to serve before the annual general meeting (30 October), when the candidates will be presented and elections held.

- C Hooker

Memories of the Chestnut

My early, vivid memories of the sweet chestnut go back to my first year at Secondary school at Strathroy Collegiate Institute in 1928. Interesting developments often arise from school chum relationships.

Because of our athletic abilities, Bill Jay and I represented the school at interschool athletic competitions in the juvenile category of field sports. Within a year, and before his family moved to London, we had established a close bond of friendship through curricular and extra-curricular activities.

Built on the Sydenham River near its origin, Strathroy was the dividing line between the sandy soil south of the town and the clay soil to the north. The sweet chestnut grows on sandy soil, but not on clay. Bill's family lived on the south side of town, and my family lived on a farm about 9 km to the northwest. Residents of the town and to the south were familiar with the chestnut, but not those to the north. I recall Bill's returning to school on his bicycle after the midday lunch break, with pockets full of chestnuts on sunny October days. Chestnuts were a new food to me. Among his friends, Bill always ensured that I received an ample share of this natural bounty.

I soon acquired a taste for this delicacy - a liking I have not lost. Unlike the large chestnuts currently

found in grocery stores, these were the smaller native nuts that are now quite a rarity in Ontario.

When entrenched on chestnut blight research during the 1980s, I was directed to a chestnut site near the town's sewage lagoon. The site consisted of a few sprouts just off the road allowance, only a few meters from the disintegrating foundation of a former farmhouse. The spot contained evidence of having produced several generations of sprouts from the root crown of the old and decaying tree stump. A few of the dead and dying sprouts had attained a height of 4-5 meters before dying from a blight infection. A virulent strain of the fungus was isolated, even though the fungus had smoldered at the site for more than 50 years.

In the early 1990s I used this site to experiment on the effectiveness of inoculations with a hypovirulent strain of the blight fungus to assess bio-control. The experiment was brought to a sudden end through the actions of an uncaring interloper, who dumped a load of rubbish on the site, obliterating all tree life.

Like many memories, this one reflects both pleasant and unpleasant experiences. It is obvious to me that my former school experience was at least partly responsible for arousing my interest in chestnut blight research. - CD McKeen

AMERICAN CHESTNUT SITE RECORD

Castanea dentata

The CCC wants to know where the chestnut trees are. You can help by submitting any of the listed information you can provide.

Owner's name, telephone, e-mail:

Street or rural address, township, county, province:

GPS or other location data:

Number of American chestnut trees:

Other environmental data:

Distributed Chestnuts

Over the past several years, many American chestnut trees have been distributed to interested property owners across Ontario, by the Canadian Chestnut Council and other agencies. These trees are the property of the landowners, but they are also a part of Ontario's American chestnut heritage and represent a large percentage of the tree's gene bank.

The CCC would like to know how well these trees are growing: whether they are blighted, dead, struggling with competition, etc. Any data that will help us define the growing requirements of American chestnuts will be welcome.

Send to any CCC director. Thanks!

How to identify American chestnut trees

Chestnut trees are most easily located while they are in full bloom, from early June, in the southern part of the range, to the weeks around the Fourth of July in the North. The great mass of conspicuous white catkins on larger trees is visible at great distances. The odor of the blooms is also quite distinctive, especially on still mornings and evenings. Later in summer, bur-laden trees are fairly obvious. In early fall, chestnut leaves turn yellow sooner than the leaves of many other deciduous trees with yellow leaves. In late fall, the brown leaves tend to stay on the trees. In fall and winter, to locate trees that had female flowers the previous summer look on the ground for fallen burs.

American chestnut leaves are long in comparison to their width, the teeth on the edges of the leaf curve inward, and the stems usually have a reddish color

Chinese chestnut leaves are more oval in shape, thicker and more leathery than American chestnut leaves.

European chestnut leaves look much like American chestnut leaves, but their teeth tend to be triangular in shape rather than curved inward.

Japanese chestnut leaves are often dark, shiny green on top and the sides of leaves are somewhat parallel.

If you have access to the internet, you can also see color photos of each species at the "Chestnut Identification" page of our Web site www.acf.org.

Membership

Membership fees and donations are tax deductible.

Membership Renewal:

Annual subscription = \$15.00 \$ _____

Donations in excess of the annual subscription will be recognized in the Newsletter in the following categories

(Requests for anonymity will be honoured):

Gold Leaf:	\$1,000 or more
Silver Leaf:	\$500-\$999
Bronze Leaf:	\$250-\$499
Green Leaf:	\$100-\$249
White Leaf:	Less than \$100

Donation: \$ _____

Total enclosed: \$ _____

Comments:

Volunteers

We need your help! As our program grows and our activities expand, we very much need the talents and skills of our members. If you would like to contribute your skills, please tell us. We start pollinating in early summer!

I'm interested in (check all that apply):

- Membership
- Publicity
- Fundraising
- Library research
- Field work
- Other: _____

Return your completed form to the Secretary:

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