

Autumn, 2009

Quick Facts

- We currently have 1852 large, healthy elms from across Ontario in our database
- We have visited over 600 healthy elms since 1998
- We have inoculated elm clones with two strains of the DED fungus
- We have 21 promising clones planted in our Seed Orchard

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Elm Recovery Project at The Arboretum

Message From Dr. Gard Otis, Acting Arboretum Director

I am pleased to have the opportunity to introduce this newsletter. In brief, Dutch Elm Disease (DED) devastated American Elm populations in Ontario in the 1960s. At first it seemed that only seedlings and small trees had survived, but over time it became evident there were large surviving elm trees scattered throughout the province. Through the insight of Henry Kock, former Horticulturist at The Arboretum, an initiative to establish a population of potentially disease-tolerant elms was launched. Cuttings from large living elms from throughout Ontario have been grafted onto local elm root-stock. After establishment, the saplings have been injected with two different strains of the fungus that causes Dutch Elm Disease to screen them for disease tolerance. Some clones have died from these injections. Other clones have been relatively unaffected and will form our living gene bank of tolerant trees.

As you will read in this newsletter, the Elm Recovery Project is still moving forward despite the tragic death of Henry Kock. We have elm

grafts grown from cuttings collected from 279 large surviving elms from throughout the province; these have been experimentally infected with the DED fungal strains. The most tolerant clones are being transplanted to create a seed orchard. Although the offspring from each large survivor elm are clones of their parent, collectively the population of 30-40 clones in the seed orchard will have considerable genetic diversity. In another few years, these trees will begin to flower. As the wind moves the pollen between the trees within the seed orchard, every seed produced will represent a unique genetic combination. We believe that some plants grown from these seeds will be even more tolerant than their parents.

You are receiving this newsletter because you contributed data for surviving elm trees in Ontario, you made a financial donation to the project, or you have an interest in The Arboretum and trees in general. Many of you who gave us money were promised an annual update on the progress of the project. This newsletter is long overdue,

and for that I ask for your forgiveness. We have intended reports on numerous occasions, but because of other day-to-day operational matters they have not been completed. Hopefully, as you read below, you will see that we have been active since the inception of this project and that your donations have been put to good use.

All who have been involved in this project, including the many citizens who provided The Arboretum with data on surviving elm trees, envision a day when American Elms once again grace the roads and streets of eastern North America. Please consider making a donation to the Henry Kock Tree Recovery Endowment Fund to help us realize that dream.



Dr. Gard Otis



A young elm graft in the nursery

Details of the work being accomplished on the Elm Recovery Project have been outlined in the media in publications such as: *The Toronto Star, The Globe & Mail, The Ottawa Citizen, The Vancouver Sun, Walrus Magazine, Cottage Life* and *ON Nature*. The ERP has also hit the airwaves with recent spots on CBC Radio Winnipeg and Regina and national television with CTV.



Professional arborist, Doug Steel, scales a giant elm to collect some twig samples

The Elm Recovery Project Makes Advances

With the help of Dr Martin Hubbes, Professor Emeritus University of Toronto, we have, to date, inoculated nearly 300 clones at our research site at The Arboretum. Our goal is to document the response of these cloned trees to infection from *Ophiostoma nova-ulmi*, or Dutch Elm Disease (DED), in order to determine if they exhibit tolerance to the disease. After the completion of our initial DED screening trials, we aim to select 30 to 40 of the best candidates for the developing seed orchard and breeding program.

Progress to Date

2004: 33 clones were inoculated with the highly virulent H175 strain of the DED fungus. The clones were evaluated at several intervals during the following season to

monitor the reaction to the exposure of DED.

2005: 39 additional clones were inoculated with the H175 strain of DED. 12 of the strongest clones from the 2001-2003 trials were moved to the seed orchard.

2006: 29 new clones were inoculated with the H175 strain of DED. 13 promising clones from the 2004-05 trials were moved to the seed orchard. 14 additional clones from previous seasons were re-grafted to increase numbers.

2007: 48 elm clones were inoculated with the H175 strain of DED. 9 promising clones from the 2005 trials were planted into the seed orchard.

2008: 48 elm clones were re-inoculated with another DED

strain, H35, to test their tolerance to back-to-back infections as well as their reaction to another strain. Nearly all of the clones showed a high level of tolerance to this strain of DED during this trial.

2009: In addition to injecting 19 new clones with H175 as in previous years, we also re-inoculated 48 previously infected clones for the third consecutive year; this time with both the H175 and H35 strains simultaneously. Evaluations are continuing, but a stronger negative reaction has occurred in some clones than with the H175 or H35 alone. On the other hand, several clones have once again fared exceptionally well through this trial which certainly aids in selecting the best candidates for the seed orchard.



The ERP disease-screening research site at The Arboretum.



Dr. Martin Hubbes conducting DED screening trials on one of our elm clones.

Funding the Elm Recovery Project

The work of the Elm Recovery Project (ERP) has benefitted greatly from 398 generous donors who together have given \$218,780 in support

These funds have been used to carry out a wide range of activities: the initial census of healthy elms in the Ontario landscape and the field trips to collect cuttings and observations from these elms; growing of rootstock material expenses

of on-going grafting of clones; the development of the research nursery and seed orchard at The Arboretum; to cover the costs of on-going inoculation testing as well as other evaluation techniques as we search for the most DED resistant clones; development of data bases for the results of our evaluation trials and existing healthy Ontario elms.

Please consider making a donation so we can continue to make progress. We need funds to grow and care for the elms in the Seed Orchard; develop a breeding program; register clones; produce and distribute seedlings; and continue monitoring parent trees whose offspring have been used for the breeding program.

Tribute to Henry Kock

Since the last formal Elm Recovery Project (ERP) update in 2005 much has occurred. By far the most significant happening was the unfortunate passing of Henry Kock on December 25, 2005, after a brave battle with brain cancer. As most of you will know, Henry had a great passion for elms and was the coordinator of the project's efforts.

Henry began working at The Arboretum in 1981 in the role of plant propagator. Over the years his position evolved into that of a Plant Collections Technician and Interpretive Horticulturist. Henry had to keep an eye on over 1700 different taxa of woody plants in over 30 woody plant collections and likely saw several hundred of thousands of young trees pass through his hands. He also had a love for teaching, especially about the interactions of plants and humans in nature. Henry instructed workshops at The Arboretum and was a regular and much sought-after guest lecturer across the province. This understanding of the natural world helped him to garner the honour of being named one of Canadian Gardening's top 55 gardeners in Canada. He was honoured as a gardening "Naturalist" for his ability to teach us how to turn our gardens into extensions of nature, instead of sterile exclusions.

Henry spent much of his leisure time out collecting seeds from plants across the province. His work with The Arboretum's Program for the Rare Woody Plants of Ontario took

him to many nooks and crannies across Ontario on the search for rare, indigenous plants such as Pawpaw, Cucumber-tree and Big Shellbark Hickory. It was during this



Henry Kock

time on the road that Henry began noticing some of the large elms that were still surviving in the province. He was especially intrigued to find some of these century-old trees in areas where hundreds of other elm trees had been killed by Dutch Elm Disease (DED). Many had believed that any elms that survived DED were simply sufficiently isolated from other trees from which the disease might spread, or that the elm bark beetles, which spread DED, simply missed those particular trees. After several years of observation, Henry, along with Arboretum Director, Alan Watson, initiated the ERP in 1998 to begin studying these exceptional survivors.

It was during a routine elm visitation trip in southwestern Ontario in February of 2004 that Henry began to feel somewhat under the weather. Several months passed until June 2004 when Henry had to take an abrupt medical leave from The Arboretum due to undiagnosed health concerns. It was shortly thereafter that

Henry was diagnosed with a Class 4 cancerous brain tumor – the most aggressive form of brain cancer. He was unable to return to his work as he endured an inspirational battle with what he referred to as "the beast". He passed away with the love of the community surrounding him on Christmas morning, 2005.

In the event of his passing, Henry had requested that any memorial gifts be directed towards the endowment fund for the ERP. Donations made during the early years of the project helped to fund collection trips and nursery work for the project, but the endowment is important in ensuring that sustainable funding is available over the long term. The response was incredible as \$25,404 came in as memorial gifts. It was decided in May 2005 that the name of the Elm Recovery Project Endowment Fund would be formally changed to the *Henry Kock Tree Recovery Endowment Fund* as both an honour to Henry and to emphasize that funds from the endowment would be used to work with other species of trees under threat in the future.

The loss of Henry has left a huge hole at The Arboretum and in the surrounding community. For all of you who had the opportunity to meet Henry when he visited your elm trees, you will have known the passion he had for his work with the elms as well nature and life as a whole. We miss him greatly.



Sean Fox, Assistant Arboretum Manager.

Sean has taken over the horticultural responsibilities of the ERP. Sean worked with Henry for a number of years and shares Henry's passion



Professor Alan Watson Arboretum Director and Coordinator of the Elm Recovery Project (on research leave until May 1, 2010)



Inoculating young grafted elms (Ulmus americana) to test for Dutch Elm Disease tolerance.

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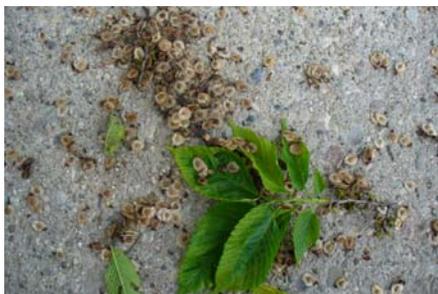
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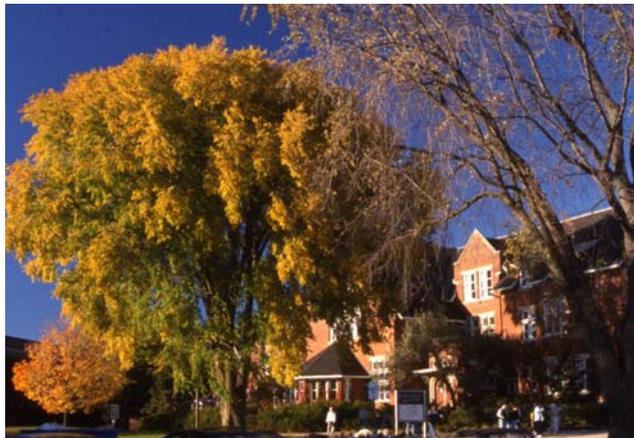
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Our mission is to develop Dutch Elm Disease (DED) tolerant elms (*Ulmus americana*) that will be available for planting in the landscape.

Techniques that we develop and continue to improve upon during the work carried out in the Elm Recovery Project may be applied, where appropriate, to other tree species that are being killed by introduced pathogens and/or insects. Examples include, Dogwood Anthracnose, Butternut Canker, Emerald Ash Borer and Beech Bark Disease.



Future issues of the Elm Recovery Project Newsletters will be published online on The Arboretum website.

The Seed Orchard



LIST OF DONORS

We have listed the names of donors to the Elm Recovery Project and the Henry Kock Tree Recovery Endowment on The Arboretum's web page:

www.uoguelph.ca/arboretum

Beginning in the spring of 2005, we began to move the first batch of elm clones that exhibited strong tolerance to DED out to a seed orchard. This was an exciting step for us as it is the first step necessary for the eventual widespread distribution of DED-tolerant elms. During the past two years, we have been able to become even more discriminating with our selection criteria as some clones have responded exceptionally well to the DED trials. This has been beneficial for us not only for selecting DED-tolerant trees, but also in giving us clues as to how these apparent survivors are able to stop the spread of the disease within the tree. As the project and testing continues, we expect to make room for multiple replicates of the 30-40 most DED-tolerant clones for our future breeding program.



Elms in the Seed Orchard need to be protected from grazing rodents and deer.

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