

February 21, 1995

THE 901 ST MEETING OF THE BRODIE CLUB

CHAIRMAN: Oliver Burtin

SECRETARY: Frank de Matteis

GUEST LIST:

MEMBER:

GUEST:

Paul Aird

Martin Hubbes (Guest Speaker)

Frank deMatteis

Carolyn deMatteis

Don Young

Jennifer Young

Bruce Falls

Hugh Currie
George Bryant

CORRECTIONS TO MINUTES:

January 1995
Meeting

Harry Lumsden pointed out that initially the Trumpeter Swan Program was sponsored by the Ontario Federation of Naturalists, and thereafter by the Ontario Federation of Anglers and Hunters. Since 1991 Scott Paper Ltd. has offered continued support. The first Trumpeter Swan eggs we obtained from Grande Prairie. Captive birds are the ones with a poorer hatch rate to birds in the wild.

MINUTES APPROVED BY: Bill Carrick

ANNOUNCEMENTS:

Norm Martin said F.O.N. had issued its list of recipients for the Achievement Award among whom was Pollution Probe.

The next F.O.N. general meeting will take place in Peterborough.

"Project Tanager" is set to commence this Spring. A catalogue of F.O.N. excursions has been issued.

Martin also presented a brochure outlining the re-establishing of natural areas around Ontario. It contained co-advertisements of various Landscaping Companies.

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TOPIC: DUTCH ELM DISEASE

The Elm can be considered a distinct part of our Canadian heritage. It is a valuable ornamental shade tree. Under its gracefully arched boughs the temperature on a hot summer day may be up to 6 degrees cooler. Of course the leaves offer Ultra-Violet protection. Appropriately enough, Elms have been planted as a war memorial in Saskatoon, and in Winnipeg alone about 280,000 Elms grace the streets.

The first outbreak of Dutch Elm Disease occurred in Holland in 1917, hence the name. It is believed that initially the Elms were stressed and thus susceptible to the pathogenic fungus due to exposure to the chemical warfare of World War 1. The fungus, originating in the Himalayas spread to Europe and then appeared in New York. The first outbreak in Canada was in 1944 at Sorrel.

The pathogenic fungus is carried to its host by the Elm Bark Beetle. It infests both lower and upper areas of the tree. The fruiting bodies of the fungus attach themselves to the beetles with sticky strands thereby spreading from tree to tree as the bugs wander. As the beetle burrows into stems and lays its eggs in galleries the fungal spores are transmitted to the plant. From these egg galleries the spores attack the tree's vascular system by blocking the vessels thereby causing wilting.

Methods of controlling the disease include:

- Originally D.D.T. but since abandoned as it was unsuccessful.
- Systemic Fungicide is only effective if many holes are drilled because the Elm is a ring porous tree. This means only the outer ring of the wood is able to conduct water. Therefore the chemical is not transported from one ring to another.
- Pruning infected limbs eventually leaves the tree a mere stump.
- Creating a simulative sticky paste of the female bark beetle's attractive hormones entraps some of the males but enough still manage to get past the trap.

In 1960, it was discovered that the Elm had no genetic resistance to the fungus; although the Dutch trees had a short-lived resistance to the disease before eventually succumbing. They were found able to encapsulate the Pathogen. This spawned the idea of creating a less virulent pathogen which was compatible with an increased defence mechanism of the Elm.

The pathogen is divided into two classes, Highly virulent and less virulent. The highly virulent one grows its mycelium on its surface, which enhances fermentation, while the other strain grows its mycelium under the surface which is less conducive to fermentation. In this way analysis is possible to identify organisms.

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Laboratory mutants are now developed and tested virulence on a genetic level. Genetic maps are developed charting the desired traits of the mutant strains. The next step is to perform D.N.A. fingerprinting to trace the pathogen's path in the tree. By this method we know identical strains of the fungus can be thousands of kilometres apart. Also, interbreeding less virulent with more potent strains verifies virulence. It is not possible to develop an innocuous mutant which does not discharge toxins.

To genetically alter a fungus strain we must introduce another fungus with the desired protein. This protein is found by Genetic Code Analysis. The carrier which is inserted into fungus blocks the normal activity of the gene, sometimes causing the fungus not to sporulate. This drastically reduces the fungus' ability to reproduce.

Population dynamics can be traced by mitochondrial mapping. Mitochondria are inherited by male or female fungi since they are bi-parental. When an Elm is infected with a weak strain of fungus the tree builds a resistance. A compound which is found in an African Tree of the genus *Mansonia* and which killed mill workers there has also been found to kill the fungus in elms. A low virulent strain triggers more of the compound than a highly virulent strain.

The question arises: Does the Elm recognize the fungus and thus produces a high concentration of compound or does the organism block the defence reaction. The answer would seem that there is a discerning mechanism at work. The glycoproteins in the plant are transmitters used to detect hostility of a fungus.

Thus a possible solution is to breed Bark Beetles in a sterile Elm log; infect them with a non virulent strain of fungus, and set them loose on disease resistant Elms.

QUESTIONS:

Bruce Falls asked if the beetle can detect a stressed tree. Yes it can and it will select weaker trees over others.

Does the fungus still grow on a dead tree? Yes, therefore dead trees should be burned.

Oliver Burtin asked how the beetle detects a tree. It does so with its antennae.

Fred Bodsworth brought to light the significance of the tree's age. Young trees are more resistant to disease and become less so with age. As for trees still being sprayed? Traditional spraying has been abandoned due to unknown effect on beetle population.

Jennifer Young asked about the beetle's enemies. Mr. Hubbes drew attention to a nematode which infests the beetle internally, eventually causing death. This nematode parasitizes many insects.

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Jim Bendill asked what made the fungus a threat to the Elm. The Relativity of fungi species does not show how it became virulent to Elms. But the Elm does provide a safe niche for the fungus relative to the soil.

Oliver Burtin noted that the Chestnut blight is a similar disease.

Jim Bendill thanked the speaker who was given a round of hearty applause.

MEMBERS' NOTES:

Fred Bodsworth presented a book entitled "Craigieburn Farm" by Alec Brodie. ^{who had pr}
It is an account of the family's immigration from Scotland in 1835 when they ^{sent it to}
settled in Whitchurch. It was written in 1903 and covers a period of six ^{the Club}
years. (1835 - 1840).

Bill Carrick took orders for copies of the photos of the 900th meeting.

Young drew attention to the diligence and hard work performed by the organizers of the 900th celebration/meeting.

The meeting adjourned at 9:58 p.m.