

Exotic nematode Found in pine trees in Melbourne, Victoria

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An exotic nematode belonging to the genus *Bursaphelenchus* was found in wood samples taken from a dying pine tree (*Pinus halepensis*) in the Melbourne suburb of Williamstown in February 2000. The infested tree was removed and destroyed by the local city authority and the Victorian Department of Natural Resources and Environment. This is the first detection of a *Bursaphelenchus* in Victoria although other *Bursaphelenchus* spp. have been found in association with *Ips grandicollis* in *Pinus taeda*, and with other insects in *Araucaria cunninghamii* in other parts of Australia. *Bursaphelenchus xylophilus*, the pine wood nematode, causes rapid death of pine trees and other conifers in Japan, Southern China, Korea, Taiwan, United States, Canada and has been recently detected in Portugal.

Bursaphelenchus xylophilus is a native of North America. It does not adversely affect indigenous North American pines but has caused extensive losses in European pines (e.g. *P. sylvestris*) planted in North America. In Japan it has been responsible for widespread mortality of native Japanese pines, particularly *P. densiflora* and *P. thunbergii*. Many millions of dollars have been, and continue to be, spent on control measures by the Japanese government. *Bursaphelenchus xylophilus*, is not known to occur in Australia. An incursion of any pine inhabiting nematodes therefore raises the spectre of a similar scenario developing in non-Asian pine species.

The nematode isolated from the Victorian tree was initially identified as a Chinese species, *Bursaphelenchus hunanensis*, however it is now considered to be a new undescribed species. A second exotic species of nematode, from the closely related genus *Ektaphelenchus* has now been found in other dying pine trees in Melbourne. At this stage it is not known whether the Victorian species are primary (i.e. has caused the death of the tree) or secondary pathogens of pines. Trials on seedling pines are being conducted to determine if the nematodes are pathogenic to them.

Ground and aerial surveys (followed by sampling and testing), have identified about 50 dead or dying pine trees containing the nematodes (mostly *Pinus radiata*). So far the disease appears confined to mature pines, possibly under stress when infested (tops of ridges, earthworks, poison etc.). The disease is distributed widely across Melbourne and in the immediate vicinity. As trees are identified with the nematodes they are being destroyed.

Symptoms of a *Bursaphelenchus* Infestation

Symptoms caused by these new nematodes are not well defined whereas those of *B. xylophilus* (pine wilt nematode) are. With the latter symptoms usually appear in late spring to early summer and develop over a four to six week period. Trees infested with this nematode generally wilt and die rapidly, although some may survive

up to a year. Three to four weeks following infection the host tree's transpiration and resin production decreases. The tree's needles at first show a greyish green discoloration and then turn yellow-brown. Needles remain attached for six to twelve months before any defoliation occurs. Symptoms may develop simultaneously over the entire crown or one branch at a time may be affected. An important symptom is the reduction in resin flow. When the branches of a healthy tree are cut there is copious resin flow at the wound site. In infested trees there may be an absence of resin. Branches and twigs are also affected and become brittle, breaking easily

Spread of Pine Nematodes

Bursaphelenchus spp. are generally carried from tree to tree by wood boring insects. In the case of *B. xylophilus* the main vectors are species of *Monochamus* longhorn beetles commonly referred to as pine sawyers. *Monochamus* species are absent from Australia and New Zealand. Many other species of wood- and bark-boring insects have been shown to carry *B. xylophilus* but none of them have been implicated in the spread of the disease. *Ektaphelenchus* spp. are carried by bark beetles such as species of *Dendroctonus*, *Scolytus* and *Ips*. In Melbourne no insect vectors have been identified. However, in some of the dead trees an introduced longhorn beetle, *Arhopalus rusticus*, has been found. It is thought that this is the first time this Northern Hemisphere species, which was identified by John Bain at Forest Research, has been found in Australia. It is extremely unlikely that *A. rusticus* is a vector of the nematode because it does not feed or oviposit on live trees as do the species of *Monochamus*.

The spread of *Bursaphelenchus* species over long distances can occur through the movement of infested wood. If this wood also harbours suitable vectors then healthy pines can be infected when the insects emerge. Species of *Monochamus* are quite frequent interceptions in casewood and dunnage but no instances are known of any of the species becoming established outside their natural range. However history tells us that there is a first time for everything! Pine dunnage and casewood from Australia harbouring live insects have been intercepted at New Zealand ports on many occasions.

Disease Control

The only available control is removal of the tree and either burning the wood or deep burial, to kill the nematode and any potential vectors.

How Can You Help

With the establishment of these nematodes in Australia we need to be watchful for accidental introduction into New Zealand. It is important to confirm early the presence of nematodes so that quick action can be taken to prevent spread. If you suspect that a tree might be infested with

a pine wilt nematode please take the appropriate samples and forward it to Forest Research. The most appropriate samples are:

- a 4-5 cm branch sample from near the trunk of the tree,
- a wedge of wood from low on the trunk, and
- a sample of a woody root taken close to the trunk.

Samples should be collected in a plastic bag and sent to:

Forest Research,
Private Bag 3020, Sala St, Rotorua
Attention: Forest Health

Web Sites about Pine Wilt

Kansas State University
www.oznet.ksu.edu/dp_hfrr/extensn/problems/pinewilt.htm
Missouri Botanical Garden
www.mobot.org/MOBOT/hort/ipm/pinewood.html

Further Reading

Bain, J.; Hosking, G.P., 1988: Are New Zealand *Pinus radiata* plantations threatened by pine wilt nematode *Bursaphelenchus xylophilus*? *New Zealand Forestry* 32 (4): 19-21.

for books

Shy explorer's adventures recounted

Peter McKelvey

Mr Explorer Douglas

John Pascoe's classic revised by Graham Langton. Published in 2000 by Canterbury University Press, Christchurch, New Zealand. ISBN 0-908812-95-7. Soft Cover; 320pp; \$39.95.

I can recall in my youth being enthralled by old books about early New Zealand exploration, especially A.P. Harper's *Pioneer Work in the Alps of New Zealand*, which was published in 1896. The descriptions in it of his exploratory journeys with Charlie Douglas in the mountains of Westland under arduous conditions, which stretched both men, fired youthful imagination. Many years later John Pascoe, himself a noted climber and explorer, researched the life of Douglas and his work in the mountains of Westland and published *Mr Explorer Douglas* in 1957. This represented an important advance in New Zealand literature of this kind for it gave the first comprehensive account of Douglas' career and explained the significance of his field work in Westland between 1868 and 1906, so establishing firmly his prominent place in the history of New Zealand exploration. The book was popular and was reprinted in that year and later in 1969. It has been out of print for a long time. Now Graham Langton, himself a seasoned trapper and climber as well as an historian, has revised Pascoe's work, adding new material, correcting some errors and re-editing the text suitable for readers in the 21st century. There is a wider range of photographs too.

This new version follows the broad structure of the older one. About one third deals with the life and accomplishments of Douglas and two thirds with his writings. Douglas' eccentricities of expression and spelling are all retained. In addition a fuller appreciation of the man has been provided which makes for a satisfying conclusion.

Douglas was employed for much of his working life by the Department of Lands and Survey to explore the Westland mountain catchments from Hokitika south to Martins Bay and the Hollyford Valley and map his findings. He was required also to report on any valuable minerals and possible tourist tracks. He developed a

great enthusiasm for mapping and his maps were often embellished by sketches of the striking topography he encountered. Later he developed an interest in photography to help illustrate this. Much of his exploring was solo, a faithful dog being his only companion, with the obvious personal risks in such dangerous terrain. He would laboriously pack his supplies up major rivers to establish bases in the hinterland and then operate from these for weeks, sometimes for months. The wages he earned were modest and he never accumulated much money; indeed he was often in debt. However he was blest by having departmental supervisors who valued his work and who respected him professionally and personally.

His writings about the country he traversed and the wildlife he encountered make fascinating reading, revealing his acute powers of observation as well as his whimsical humour and philosophy. His account of the many species of birds he became familiar with - he had to eat a lot of birds to stay alive - has been likened to a substantial and valuable monograph in which due account was taken of ecological features, even though the treatment was unsystematic and often discursive. Unfortunately for the forester and botanist there is not a great deal included of his observations on the flora; the notable exception was on his Copland exploration. This is a feature that was pointed out by the late Dr Jack Holloway in his comment on the 1957 edition. Holloway took the trouble after the publication of Pascoe's book, and with the ready assistance of the author, to go through the copious notes Douglas made on the vegetation and included some of these as examples in his published critical comment. It is a pity that more of Douglas' observations on the vegetation were not included in the new edition.

The reader will come to the end of Langton's revision with a good understanding of the sort of man that Douglas was, and that is one of the pleasing features of the book. He was born in Edinburgh in 1840. His first job was in a bank there where his father and three brothers worked or had worked. However Charlie preferred to march to an unconventional drum and soon took off on