Beech dieback in Whanganui National Park

What are beech trees?
The main beech tree in Whanganui National Park is black beech or tawhairauriki (Nothofagus solandri var. solandri). It is a tall tree (20 - 25 m) with small, oval, dark green leaves and grey, furrowed bark.

Black beech is one of about 35 species of southern beech, an ancient group of trees from Gondwanaland. Four other species are found elsewhere in New Zealand and others grow in Australia, South America, New Caledonia and so on. Fossils of southern beech have been found in Antarctica.

Back beech grows in the lower North and upper South Islands. It is an important part of forest ecosystems. Kakariki and kaka feed on the hard seeds. The trees themselves host epiphytic plants and the semi-parasitic native mistletoes. The black beech trees in Whanganui grow on narrow, papa ridges and bluffs where they form obvious stands of dark trees along the ridges.

Growing up on stony, exposed ridges makes beech trees vulnerable to drought and to storm damage, but they are usually pretty tough.

What is happening to the beech trees in Whanganui?
Many people have noticed that the beeches, which are such a prominent feature of the forest, are starting to die off. The small leaves turn bright orange or brown before the tree dies. In some patches 30 or more trees are affected.

Photograph taken in 2008 showing beech dieback.

New Zealand Government
How big is the problem?

We don’t know for sure but observations made over the summer of 2011-2012, both on the ground and from helicopters suggest a broad area is affected covering most of Whanganui National Park. However, some stands remain healthy, some have only lost one or two trees, while others are suffering near total mortality. The biggest concentration of dieback seems to be in the south.
How long has this been going on?

DOC staff first noticed the beech tree dieback in 2006 but it became a concern in 2008 when the front photograph was taken. Since then it has become much more widespread and greater numbers of trees are dying.

Why are the beech trees dying?

No one is sure why, but it is thought likely to be a natural process triggered by several different factors; including storm damage and drought. Just in case, DOC collected trunk and foliage samples from recently dead trees at five different sites in the Park, and took them to scientists at Scion in Rotorua for analysis. The scientists did not find any unusual diseases or insect pests.

Widespread beech dieback is not uncommon, when a small event flows-on to much bigger consequences. The pattern seems to be:

This chain of events is most likely when most of the trees are old and therefore more vulnerable.

Does this happen in other places?

There has been a lot of research into beech tree death and regeneration in New Zealand. One example is:

A 1981 study of western Ruapehu mountain beech forest, where 40% of all standing beech trees were dead or apparently dying, determined the cause to be a drought in the late 1960s, which had stressed the trees and potentially allowed the pinhole-boring Platypus beetle to attack the roots and trunks of live trees (Skipworth 1983).

What might be the trigger here?

Recent weather conditions which are likely to have stressed the trees are:

- The 2004 storms, which caused extensive tree damage and slips throughout the region.
- The drought during the summer of 2008 (preceded by dry summers in 2005 and 2007).
- The heavy snows of last winter.

Most of the trees are old. A few stressful seasons have been too much for them. The samples collected last summer did contain pinhole borer damage, indicating the trees were stressed.
What is DOC doing about it?

We think the beech tree dieback is a natural process. Studies of large beech forests in the Kaweka Mountains have found that gaps are an important part of the forest life cycle, providing the space and light for tree seedlings to come away.

As each generation of trees grows old and dies it is important that they are replaced with young, healthy trees to form the next generation.

Southern beeches often have a ‘seedling bank’ rather than a ‘seed bank’. Seeds usually sprout quickly and then wait for a gap to occur. Mountain beech seedlings may wait for 20 or more years as plants less than a metre tall. Goats and deer eat and trample young beech seedlings and are known to prevent their regeneration. While beeches are not particularly tasty, the ridges they grow on are dry and easy to travel along. Like people, animals use those ridges as tracks to get around the Park.

As part of the Kia Wharite project, DOC, Horizons Regional Council, iwi and land owners are working to control goat numbers in large areas of the Whanganui forests to reduce barriers to the growth of a new generation of trees. Unfortunately, the goat control aspect of the project does not extend to cover the most affected areas.

Why aren’t you spraying the pests?

There are three main reasons for not taking this action. First, the cycle described above is a natural process and the beetles, moths and fungi that may be involved are indigenous species. In addition, because it is not known exactly which species are responsible for the dieback, sprays would have to be general and may put other native species and commercial species such as honey bees at risk. Finally, the large size of the affected area and the need to target only some of the trees within it, would make spray treatment very expensive.

What more do we need to learn?

DOC is working to get better answers to these questions. We plan to collect more information on the problem by:

• Using aerial photographs to map the extent of dieback as a baseline for the future
• Surveying ridges to determine numbers of beech seedlings and saplings in the affected areas

Further information


References


