Forest Health News

SCION forests · products · innovation

No. 245, February 2014 ISSN 1175-9755

CAN WE USE FIRE WEATHER DATA TO PREDICT THE RATE OF SAPSTAIN DEVELOPMENT AFTER STORMS?

The appearance of sapstain with its associated monetary loss is always a worry to forest managers who have to recover valuable wood from plantations damaged by storms. One of the uncertainties is in knowing just how much time is available before the broken stems deteriorate to the point when a salvage operation is no longer economic. Because sapstain fungi and the risk from fire are both influenced by the rate at which the wood dries, it was suggested that publically available fire weather data might be used to predict how soon sapstain will appear, in the same way that they are used to assess fire hazard.

In March, 2012, *Forest Health News* reported on a collaborative project that investigated the rate that fallen stems deteriorated after storms in radiata pine plantations (*Forest Health News 223*: 1-2). As part of this work the development of sapstain was evaluated in trees artificially felled at different times of the year in a number of locations throughout the country. Results confirmed that the speed with which stems deteriorate depends on seasonal and regional weather factors. It was verified that log recovery must be carried out more rapidly after damage during spring and summer than in autumn and winter and that the available salvage period is shorter in warmer regions such as the northern North Island.

To see if there was any predictive relationship, the information obtained during this project was compared with downloaded daily fire weather data covering the same period. The variables tested were temperature, rainfall and the index Drought Code which seemed the most appropriate since it applies to slow drying forest fuels relating to deep organic duff layers and large logs. When the Drought Code values were matched with data from the sapstain project it became clear that this index is not helpful in forecasting the rate of sapstain development. It seems that the weather affects fuel drying and fire hazard differently from the way it influences the establishment and growth of colonies of sapstain fungi within wood and the Drought Code index does not take this variation into account.

Rainfall also showed no relationship with sapstain but temperature was significant. It was found that sapstain only developed when daily temperatures exceeded 21°C. This helps explain why sapstain is of less concern when damage occurs during winter. However, this is not the whole story. Sapstain did not always appear as soon as temperatures reached 21°C, implying that other variables are involved. An important factor appears to be the wood moisture content. The data indicated that sapstain developed more slowly above the temperature threshold at locations where the moisture content of the fallen stems was greater than at other sites.

Therefore although fire weather variables appear unpromising as a predictor of sapstain in fallen wood this investigation did identify features likely to be of some assistance to forest managers. Sapstain will probably not be significant until daily temperatures reach 21°C after the passing of winter. It is then likely to appear within one to two months but may develop more slowly if the wood moisture content remains high.

A full account of this study can be found in: Hood I.A.; Kimberley, M.O.; McCarthy, J.K. (2014). Forecasting sapstain after windthrow in pine plantations. *New Zealand Journal of Forestry 58*: 22-25.

Ian Hood

Severe sapstain in a tree felled during a storm in a *Pinus radiata* plantation.

*Newsletter of the **Scion Forest Protection team**, and the **Forest Health Reference Laboratory** (incorporating the Forest Research Mycological Herbarium (NZFRI-M), the Forest Research Culture Collection (NZFS), and the National Forest Insect Collection (FRNZ). Edited by John Bain, New Zealand Forest Research Institute Ltd, Private Bag 3020, Rotorua.*
<john.bain@scionresearch.com> *Web site* <http://www.scionresearch.com/biosecurity>

MOLECULAR CHARACTERISATION OF *CYCLANEUSMA* SPP. FROM NEW ZEALAND PLANTATIONS

Cyclaneusma needle-cast (CNC) is a foliar disease of *Pinus radiata* that has been known to cause a major impact on growth in some regions of New Zealand. The disease is caused by *Cyclaneusma minus* of which there are at least two morphological types in New Zealand. Recent molecular research by Australian colleagues has confirmed that these two morphotypes, termed "simile" and "verum"[1], could in fact be separate species (Prihatini et al. *manuscript in preparation*).

In New Zealand, we do not know the role of the two different morphotypes in causing CNC. Previous research looking at the distribution of the two morphotypes showed that "simile" was more common in the North Island and less common in the South Island. However, populations varied between forests, and also varied at locations between collection periods.

Over the past summer Shannon Hunter, an Auckland University student, has been working on molecular characterization of the *Cyclaneusma* spp. from the Scion Reference Laboratory Culture Collection. The isolates had been made from collections taken from 1969 to 2011 and in total 76 isolates were analysed. The results of these analyses showed that the most prevalent morphotype was *Cyclaneusma minus* "simile" and this morphotype is found throughout New Zealand. DNA sequence analysis of additional genetic regions showed separate phylogenetic grouping of the two morphotypes as observed in the study by Prihatini et al. providing further support for the morphotypes being separate species.

This preliminary study will support future research analysing the genetic diversity of the morphotypes to form a better understanding of their roles in either promoting or inhibiting CNC disease.

Rebecca McDougal & Shannon Hunter

[1] Dick, M.A., Sommerville, J.G., & Gadgil, P.D. (2001) 'Variability in the Fungal Population' in Cyclaneusma needle-cast in New Zealand. LS Bulman and PD Gadgil (eds.), *Forest Research Bulletin, No. 222*, p. 12-19.

COTESIA URABAE GEOGRAPHIC RANGE EXPANDING

Gum leaf skeletoniser (*Uraba lugens*) is an Australian moth with hairy caterpillars that defoliate eucalypts. It has been in Auckland since at least 2001, and has since spread to many parts of the North Island and Nelson. The specialist parasitoid *Cotesia urabae*, introduced from Australia, was first released in Auckland by Scion in 2011. Multiple releases in Auckland have resulted in the parasite producing self-sustaining populations that are now spreading throughout the city.

Scion has now also released the biological control agent in Whangarei, Mount Maunganui, Nelson and most recently in Napier. To date, as well as Auckland, establishment has been confirmed in Whangarei and in Mount Maunganui.

On 25 February 2014 Belinda Gresham undertook a release of the parasitoid at the Park Island Recreation Ground in Orotu Park, Napier. Using the same successful method used in previous releases, she attached approximately 450 previously parasitoid-attacked gum leaf skeletoniser larvae to the foliage of two large eucalypt trees. She also released 66 parasitoid wasps – equal numbers of males and females.

Uraba lugens appears to be quite abundant at Park Island and throughout the greater Napier area. Many of the eucalypt trees inspected revealed the caterpillars distinctive feeding damage, and horticultural staff of the Napier City Council have reported unpleasant experiences with these hairy pests at this site in the past. This is because gum leaf skeletoniser caterpillars are covered in urticating hairs that can cause some people to get an itchy skin rash even after the caterpillar has died. This release of the parasitoid was supported by the Hawke's Bay Regional Council, the Napier City Council and the Department of Conservation. Regional Council pest officer Alice McNatty assisted with locating a suitable release point and the actual release on the day.

Toni Withers and Belinda Gresham

Foliage with parasitoid-attacked larvae attached to a tree with resident larvae close by.

Printed by Scion Digital Print Centre, Rotorua (07 343 5711)