Forest Health News

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GIANT WILLOW APHID UPDATE

The giant willow aphid (*Tuberolachnus salignus*) was first found in New Zealand (Auckland) in December 2013 (FH News 246). Within a few months it was widespread throughout the country. In Australia, it was first found in March 2014 and is recorded in Tasmania, New South Wales, Australian Capital Territory and Victoria. Its usual hosts are willows and poplars and it has been found on a very wide range of willows species and hybrids in New Zealand.

The aphids aggregate and can form dense colonies on infested trees. Somewhat unusually for aphids, they feed on stems rather than on twigs and foliage. In the United Kingdom, the pest has significantly reduced growth of willows and is known to be capable of killing willows over 10 m tall. Studies have shown that root development is reduced and aphid attack may predispose willows to abiotic stress factors such as frost or drought.

A giant willow aphid (*Tuberolachnus salignus*) colony. Picture: Bryce McQuillan

In New Zealand, heavy colonisation of willows has been seen in many parts of the country. This year, young trees in the National Willow Collection in Palmerston North have died because of aphid attack. Young and old trees have been blackened by the sooty mould that develops on the large volumes of honeydew that the aphids excrete. Standing underneath an infested willow, the honeydew can be felt like light rain. This honeydew has several unwanted effects. It coats not only willow foliage but anything else within range, for example sheep and machinery. The carbon rich honeydew may change soil chemistry. Significant increases in wasp populations have been noted near infested willows, not only causing problems for people and domestic animals, but also increasing bee mortality. Honeydew is collected by bees and processed into honey, but this honey has several unattractive characteristics. Its taste may be less appreciated by consumers than other honey and, more importantly, it is extremely difficult to extract from the hives. This has resulted in significant production loss for some beekeepers.

A bee collecting honeydew before it is brought back to the hive and processed into less valuable honey. Note the large amounts of sooty mould developing on the leaves covered with honeydew.

From June 19 to 21, the Apiculture NZ National Conference was held in Rotorua. Stephanie Sopow presented, describing the giant willow aphid, the damage caused, and what Scion is proposing to reduce its effect on willows and on primary industries. This month, Scion is initiating a biological control programme, starting with an application to import a parasitic wasp and preliminary research to develop protocols for rearing the giant willow aphid in containment. We also hope to collect native aphids that may potentially be attacked by the control agent and start colonies in containment so when the biological control agent is imported we are ready to start non target host testing. This work will be financed by MPI's Sustainable Farming Fund, Scion core funding and direct and in-kind support from many stakeholders.

Stephanie Sopow (Scion)

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PREDICTING RED NEEDLE CAST

Red needle cast is a relatively recent disease of radiata pine caused by *Phytophthora pluvialis*. Affected trees do not die, but much of the crown turns an orange-brown colour and growth is temporarily reduced. Scion is conducting research into disease management using two approaches: selection of resistant or tolerant tree stock for new plantings and aerial application of an effective fungicide. Red needle cast outbreaks are unpredictable and vary in different years, seasons and regions. In order to know when to spray, we also need to understand how the disease works. When are the spores produced? At what time does infection occur? How are these factors affected by the environment? What are the conditions regulating the disease? It would also be beneficial if we could predict and limit treatment to years when outbreaks occur.

To address these questions, Scion, in collaboration with forest managers and with the assistance of many Scion and forestry staff, conducted a project to monitor the disease at a number of locations in the North Island and northern South Island. Selected trees were assessed for disease severity at fortnightly intervals for two years. In addition, spore release was followed indirectly over the same period. Traps consisting of leaves and pine needles floating in water were used to determine if *Phytophthora* was present. This information was analysed together with local virtual daily weather data interpolated from nearby stations provided by the National Institute of Water and Atmospheric Research (NIWA) to see if there were any relationships. At one of the locations some of the trees had been aerially sprayed with phosphite fungicide in an experimental attempt to control the disease. As a further study, some of the bait traps were placed beneath fungicide treated trees in order to see if the production and release of spores might have been reduced.

The key finding from this work was that although *Phytophthora* spores were produced during much of the year, there was a greater chance of detecting them in the bait traps during cooler temperatures and after days of higher rainfall. Moisture from rain, dew or fog is required for spore germination on needle surfaces and the colder months of autumn and winter were found to be the preferred period. *Phytophthora pluvialis* was detected more frequently in the traps than *P. kernoviae*, another species sometimes found infecting radiata pine needles. No trends were revealed from the monitoring of crown symptoms in selected trees, but the information obtained will be useful as complementary data in a new project attempting to relate disease to weather. Disease outbreaks at particular locations have been observed to recur at intervals exceeding the two year span of the present study. The experimental spray application failed to control the disease, for a number of reasons, so it was not surprising that there was no decline in the detection of the *Phytophthora* species in traps placed beneath sprayed trees.

This project has been valuable in recognising and confirming the significance of cooler temperatures and rainfall in contributing to disease development. It is now necessary to refine the work by quantifying more precisely the parameters under which infection occurs, for instance by conducting inoculation experiments under a range of controlled environmental conditions.

Nari Williams and Ian Hood (Scion)

Trees affected by red needle cast at an inoculum bait trap site. Picture: María Hance

***Phytophthora* inoculum trap in place. The dark, square, muslin bag containing the foliar baits is visible floating on water beneath the protective wire grid that covers the container.**

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