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MIMOSA WILT CAUSING SILK TREE DIEBACK AND MORTALITY

Silk trees, *Albizia julibrissin*, are popular ornamental trees in streets, parks and private properties. They are a beautiful shade tree with their natural spreading canopy and prolific pink flowers in summer. In 2015, a significant number of *Albizia* started dying in Pukekohe, south of Auckland. Early in 2016, *Albizia* with similar symptoms were evident in Papatoetoe, Auckland.

Sick *Albizia* in Pukehohe.

Our diagnostic laboratory received the first sample from *Albizia* in 1980, and for the following 25 years, samples were rare and of little concern. Significant *Albizia* mortality was first noted in 2005 when we received samples from dead and dying street trees planted in west and central Auckland. The trees were detected under the high risk site surveillance programme. Groups of trees that appeared to be affected were flanked by trees showing no damage. Symptoms were wilting foliage, top and branch dieback, sap exudations from the stem and staining in the wood (particularly in the roots and lower stem). Staining in wood directly under the bark is typical of many vascular wilt diseases and is caused by tyloses, a host reaction in response to colonisation of the plant's vascular system by a fungus. A similar reaction occurs in elms in response to colonisation by *Ophiostoma novo-ulmi*, the cause of Dutch elm disease.

Fusarium oxysporum was identified from isolations made from wood and fruiting bodies found on the stem. *F. oxysporum* is a species complex comprising of many strains or *formae speciales*. These have a broad host range and vary significantly in pathogenicity and virulence. The symptoms suggested the fungus could be *F. oxysporum* f. sp. *perniciosum*, the cause of mimosa wilt. This pathogen is native to central China to Iran and was introduced to USA in the early 1800s. It is present in Puerto Rico, Argentina, Greece, and is likely to be in Russia and Japan. The disease often results in rapid death of the tree.

In 2005, samples were sent for DNA analysis and based on sequences available in genbank at the time, the results were inconclusive. The Ministry for Primary Industries was informed of a potential new to New Zealand discovery and we retained cultures for future reference. In early 2007, a Scion pathologist collected samples from a group of silk trees of various ages growing in Tauranga that were showing severe dieback. This time, the sequences from DNA analysis were identical to those of *F. oxysporum* f. sp. *perniciosum* from North Carolina on *Albizia julibrissin* and from the 2005 Auckland isolates. There was no longer any doubt that mimosa wilt was present in New Zealand. Since 2007, there have been no confirmed records of *F. oxysporum* f. sp. *perniciosum* from 10 suspicious samples sent in, although interestingly *F. lateritium* (another species complex!) was isolated from *Albizia* in Tauranga and Morrinsville that were showing dieback and defoliation.

Samples from Pukekohe and South Auckland have failed to yield *F. oxysporum* f. sp. *perniciosum* but Auckland City Parks managers have taken a precautionary approach using good management practice to limit the pathogen's spread. Simple control measures such as removing mulch from chipped trees and ground stumps from circulation via landfill, sterilising equipment and disposing of excess soil safely have been initiated. Records are being kept of where diseased trees have been removed to ensure that replacement species are not *Albizia*.

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INSECT PESTS AFFECTING DOUGLAS-FIR IN NEW ZEALAND AND OVERSEAS

In the previous issue (FHN 265), it was mentioned there are a number of long-established exotic insect pests and native insects that can affect Douglas-fir in New Zealand.

Among the most commonly found caterpillars are the native loopers *Pseudocoremia fenerata* and *P. suavis* (Lepidoptera: Geometridae). *P. suavis* outbreaks were recorded in Kaingaroa in the 1970s, in association with the needle cast fungus *Phaeocryptopus gaeumannii*. Other outbreaks have been recorded in Canterbury. These are worth mentioning, as they are probably some of the few known cases where large areas of exotic conifer forest in New Zealand have been defoliated by an insect.

Caterpillars of the common forest looper *Pseudocoremia suavis* feed on a wide range of trees and shrubs. Picture: Phil Bendle.

Other native insects have been observed damaging leaves or tips, such as the brownheaded leafroller, C*tenopseustis obliquana*, and the blacklegged leafroller, *Planotortrix excessana*, (Lepidoptera: Tortricidae), the forest semilooper *Declana floccosa* (Lepidoptera: Geometridae), and the bronze beetle *Eucolapsis brunnea* (Coleoptera: Chrysomelidae).

The native longhorn beetle *Coptomma lineatum* (Coleoptera: Cerambycidae) affects shoots and branches of larger Douglas-fir trees, causing the end of the branch to "flag". Very occasionally it can result in malformed trees or trees with multiple leaders. Larval galleries in the branches can also extend in to the tree's main stem, affecting sawn timber grading. Other native and long-time introduced longhorns *Arhopalus ferus*, *Calliprason pallidus* and *Prionoplus reticularis* (Coleoptera: Cerambycidae), bark beetles *Hylastes ater*, *Hylurgus ligniperda*, and wood borer *Pachycotes peregrinus* (Coleoptera: Curculionidae), as well as the native termites *Kalotermes brouni* (Isoptera: Kalotermitidae) and *Stolotermes ruficeps* (Isoptera: Termopsidae) are usually confined to dead and dying material.

Despite Douglas-fir plantations covering about 105,000 ha in New Zealand (essentially in Otago and Southland), there are currently very few introduced pests damaging these. The chalcid *Megastigmus spermotrophus* (Hymenoptera: Torymidae) had been established since the 1920s, and is now distributed throughout the country. Its effect on Douglas-fir seed-production is relatively limited with losses only locally exceeding 20% in certain years. In Europe, however, where *M. spermotrophus* had also been introduced, seed losses are higher and on occasion exceed 90%.

The western conifer seed bug *Leptoglossus occidentalis*, with its noticeable white zigzag stripes across the centre of the forewings and its flattened, leaf-like expansions on the hind legs. Picture: Kjeld Brem Sørensen.

Current bans on Douglas-fir wood products, whole plants and cuttings help prevent future spread of most insect pests from their native area. However, several moderate to high importance pests may present a risk for New Zealand. Another seed-affecting invader, the western conifer seed bug *Leptoglossus occidentalis* (Hemiptera: Coreidae), has been highly successful in escaping its native area, and has colonised most of Europe and Japan over the last decade. Other potentially high impact invasive pests include the Douglas-fir cone moth *Barbara colfaxiana* and the western spruce budworm *Choristoneura freemani* (Lepidoptera: Tortricidae), the Douglas-fir tussock moth *Orgyia pseudotsugata* (Lepidoptera: Erebidae) and the Douglas-fir beetle *Dendroctonus pseudotsugae* (Coleoptera: Curculionidae).

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