Wood supply forecasting
Small, privately-owned forests account for a significant proportion of the national estate in both New Zealand and the United Kingdom. As the private forest area is expanding, it is becoming increasingly important to be able to forecast future wood volumes from this resource. Collaboration is being carried out between the Forest Enterprise, the Forestry Authority and FRI to address the difficulties imposed by the nature of this resource. The forests are scattered, vary widely in size and growth rate, and information is often incomplete. In addition, the decision to harvest is based on the personal circumstances of the owner and is often influenced by non-economic factors, and landscape or conservation considerations can greatly influence harvesting decisions.

Forest wind risk modelling
Wind damage is a major natural hazard to plantation forestry in both New Zealand and the UK. The collaboration between FRI and the Forestry Commission Research Agency has focused on developing a fundamentally-based wind risk model to replace existing hazard-based schemes. The completed model will predict both the site wind speed at which a stand will fail, and the probability of that or greater wind speeds occurring. Forest managers will be able to use the model to evaluate site, species and management actions in terms of the risk of wind damage to forests.

TechnicaL NOTE

A fly in the willows

Chris van Kraayenoord

Willows in the Auckland area have been stripped of foliage by an insect pest hitherto not known in New Zealand. It has been identified by Landcare Research as Nematus oligospilus, a willow sawfly.

The sawfly was first noticed defoliating a weeping willow and a tortured willow in South Auckland in mid-February, and a subsequent survey by the Ministry of Agriculture showed that it was present throughout the greater Auckland region, from Albany to Mangere. In early April, an infestation was discovered on golden willow in Rotorua. It is not known how and when the sawfly arrived in New Zealand, but its widespread occurrence indicates that it has been present in the country for at least two years. It is therefore regarded as being established and that it cannot be eradicated anymore. It is here to stay!

Nematus oligospilus is native in Europe and North America, but has now spread to the Southern Hemisphere. In 1992 it was recorded for the first time in South Africa where it attacked weeping willow and crack willow. The same sawfly or one very closely related appeared in 1980-81 in Argentina, and in 1984 in Chile. It showed extensive and rapid spread in Argentina, moving 3000 km in 10 years, or 300 km a year.

A female sawfly can deposit up to 60 eggs in tiny slits on the underside of leaves. The emerging larvae, which resemble but are not true caterpillars, concentrate in large numbers on the leaf margin, from where they feed inwards, afterwards leaving only the midrib. The larvae pupate in the soil. Depending on climatic conditions, the average life cycle is one month. There are generally up to four generations a year.

The fact that there are several generations a year, and there are no natural biological control agents, will mean that population build up can be extremely rapid, and severe infestations can be expected in the future. An impact assessment report by the Ministry of Agriculture suggests that the insect is well adapted to New Zealand conditions and could have a major impact on willows.

Allan Wilkinson, a HortResearch poplar and willow scientist, has emphasised the national importance of willows. They are used for river and stream bank protection (many thousands of km), for hill-country erosion control (500,000...
planted per year), and for horticultural shelter (over 10,000 km of kiwifruit shelter). The present nursery production of willows is 250,000 units per year. All these plantings could be seriously affected. With two defoliations each summer, nursery stock and young trees can be killed. Older, established trees, even when only partially defoliated, will be weakened. This will cause major damage to the root system efficiency, their stability, and their erosion control and soil binding capacity.

Vulnerable

According to overseas reports, all willow species are attacked and several species appear to be resistant to the sawfly. In New Zealand, where willows are not native, few species are in general use and many of these are single clone selections. This small genetic base makes willow plantings vulnerable to any new disease or insect attack. It remains to be seen which willows are attacked in New Zealand. Thus far, the sawfly has been reported on weeping willow (Salix babylonica), tortured willow (S. matsudania ‘tortuosa’), pencil willow (S. humboldziana fastigata), golden willow (S. alba var. vicillina), and basket willow (S. reichardtii (uncertain identification)).

Samples of the most important willows will be grown under glasshouse conditions next summer at the HortResearch Centre at Mt Albert in Auckland. These will be used for susceptibility screening of the willows and to study the biology of the sawfly. As it appears likely that the insect will spread throughout the North Island next year, it may be possible to observe host preference under field conditions at the HortResearch Aokautere Research Centre in Palmerston North. The Centre maintains a collection of over 200 willow clones and cultivars. Selection of resistant clones will form the basis for a willow breeding programme. This will be aimed at obtaining a wider genetic base of insect and disease-resistant cultivars which are adapted to New Zealand conditions.

Another Sawfly

As a final note, this new willow sawfly should not be confused with another sawfly, Pontania proxima, which has been in New Zealand for over 40 years. This sawfly attacks mainly crack willow and golden willow, but not weeping willow. It causes red or yellow galls to develop on the leaves. The larvae complete most of their life cycle in the galls and pupate in the soil. They do not defoliate the trees and although unsightly, these galls have little effect on growth or vigour.