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Report to Landcare Committee
from Steve Murphy, Operations Engineer, Flood Protection Group

Willow Sawfly in the Wellington Region

1. Purpose

To advise the Landcare Committee of the presence of willow sawfly in the Wellington area, and the potential threat to river management willow plantings.

2. Willow Sawfly (*Nematus Oligospilus*)

The willow sawfly is a Northern Hemisphere insect that attacks willow trees (*Salix species*) by eating the foliage. It occurs naturally throughout Europe and North America. It was first discovered in Argentina in 1980, and South Africa in 1993. It is also probably present in Australia.

The insect was first noticed in New Zealand in 1997 following heavy defoliation of willow trees in Auckland. It was first observed on the Hutt River last summer, and has since spread as far south as Canterbury. It is expected to arrive in Invercargill by 2003/04.

Adult sawflies lay their eggs in small cuts made in willow leaves. The emerging larvae feed on the leaves until the cocoon stage when they pupate into an adult fly. The length of the life cycle is dependent on environmental conditions, but in laboratory tests averaged about 35–40 days. Numerous life cycles are therefore possible before the insect over winters in the soil or leaf litter. With few if any natural enemies, and a ready supply of willows, the insect has tremendous population potential.

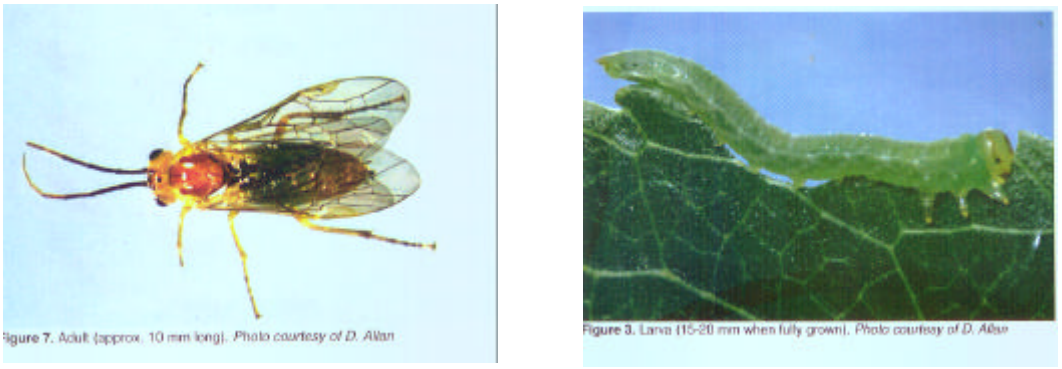

Figure 1 : Sawfly and larva. From *"A Guide to Willow Sawfly in New Zealand"*, Hort-Research

3. Observations in the Wellington Area

Sawfly were first observed on the Hutt and Kapiti Coast rivers last summer. The infestation was minor and little observable damage was caused.

Recent observations reveal that the insect is now present over the length of the Hutt, Otaki, and Waikanae scheme areas, but at this stage is still only a minor infestation. Chewed leaves are readily observable on some trees, but larvae are still reasonably difficult to find. Adult flies were observed, but no eggs or cocoons were seen.

Early leaf fall in some areas, due to water stress, is more of a problem than the sawfly at present.

Sawfly is also present in the Wairarapa but in very low numbers.

4. Potential Consequences for Western River Schemes

Evidence from other southern hemisphere countries, particularly South Africa, suggest that sawfly damage could be a serious threat. Heavy defoliation of willows has already occurred in areas of Bay of Plenty, and Hawke's Bay, where the insect has been established for several years. Committee members may have already seen the attached newspaper clipping (see **Attachment 1**).

Population blooms of the insect may see favoured willows completely stripped of their leaves twice in one year. This level of damage is known to reduce a trees root mass by up to 90 percent, and has serious implications for the willows' bank holding ability and growth rate.

Willows are a primary riverbank protection measure in the Wellington region. The Council has a substantial investment in willow plantations on the Hutt, Otaki, and Waikanae Rivers, and in the Wairarapa. Our asset records show a total of 54.3 kilometres of willow plantings on the Hutt, Otaki and Waikanae Rivers, with an estimated replacement value of $2.3 million.

Willows also provide erosion protection on many of the minor watercourses maintained by the Council, as well as extensive plantings on private property. New Zealand wide there are many thousands of kilometres of riverside plantings as well as extensive plantings for hill country gully control, and nursery shelter belts. There are limited alternatives to the willow, but few have all the willow's attributes of extensive root structure, quick growth, love of wet feet, and miraculous ability to quickly and cheaply grow a whole new tree from pieces of another poked in the ground.

The majority of these plantings are tree willow or shrub willow hybrid clones, but there are also numerous plantings of crack and golden willows, such as those on the Porirua Stream, and numerous rural watercourses. Anecdotal evidence from around the country indicates that all these willows are susceptible to attack and are at risk to varying degrees. The limited amount of genetic variability in New Zealand's willows increases the sawfly risk.

5. What is Being Done About the Problem?

Following the initial outbreak, Hort-Research carried out initial investigations into the likely impact. Following this, further research, partly funded by the 'Willow and Poplar Research Collective' of which Wellington Regional Council is a member, was undertaken. The collective promotes the use of and research into the development of willows and poplars for riverbank stability and soil conservation. The Wellington Regional Council contributes $7,500 annually to the work of the collective.

Research progress was still unsatisfactory however, and in order to progress the matter, the 'River Managers Group'[1] has now contracted Hort-Research directly to carry out a five year comprehensive research programme into the sawfly. Wellington Regional Council contributes $5,000 annually to this research through this group.

The research will cover the following:

- The sawfly life cycle in New Zealand and the influence of environment
- The likely impact of sawfly on willow growth and survival
- The potential economic impact to New Zealand
- Laboratory trials to identify sawfly resistant willows
- Determine the chemical composition of resistant foliage
- Identify resistant willow species in New Zealand and overseas
- Commence a breeding programme for resistant willow varieties
- Research insecticides and biological controls
- Research alternative species suitable for erosion control.

The group is also lobbying for further funding from FRST (Foundation for Research, Science and Technology).

6. Summary

The willow sawfly is now well established in New Zealand and eradication is not a feasible option.

Overseas and recent New Zealand evidence suggests there is a real risk to existing willow stands in this country, but further research is needed to quantify this.

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[1] The 'River Managers Group' consists of flood protection management staff from most Regional Councils and three District Councils who meet regularly to pool ideas on river management issues.

Loss or serious damage to willow stands in the Wellington Region will likely result in increased flood damages and large costs for alternative protective measures.

Regional Councils, through their Flood Protection Managers, have initiated research into the sawfly and possible control options, but funding is limited.

Sawfly damage was evident on the Hutt River last summer and it is now firmly established in low numbers throughout the western part of the region. Damage to date has been minor and is not expected to be of concern this season.

The situation will be monitored closely to warn of any increase in damage. Staff will keep up to date with developments through their involvement with the 'Willow and Poplar Research Collective' and the 'River Managers Group'.

7. Communication

The presence of willow sawfly in the Wellington area will be of interest to the general public and of particular interest to rural landowners with riparian willows on their property. An article will be prepared for the April edition of the Council's "Elements" newspaper. This article will help readers recognise the insect and advise them of the risks to their willows.

8. Recommendation

That the Committee receive the report and note the contents.

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Attachment 1 : Newspaper cutting from The Dominion, 11 January 2001