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Report to the Rural Services and Wairarapa Committee
from Ian Gunn, Manager, Operations

Willow Sawfly Research

1. Purpose

To update the Committee on the recent research undertaken on the willow sawfly.

2. Background

In the last 3 years willow sawfly has been found in willows in New Zealand. It has spread throughout the North Island and down to Central Otago in the South Island.

In the Bay of Plenty and Gisborne/Hawkes Bay regions, extensive defoliation has resulted from sawfly attack. There are concerns that the sawfly will limit the effectiveness of the willow as a tool in river and land management.

The willow sawfly has been identified in limited areas within the Wairarapa over the past two summer seasons. Minimal damage to date has been observed.

The Engineers from both the Landcare and Wairarapa Divisions, plus the Soil Conservators, are contributing to research into the sawfly. HortResearch are the lead agency.

3. Results of Research 2000/01

Four studies have been completed.

- (a) The impact of willow defoliation. Both in the field and in tunnel houses. In situations where the willow has been defoliated every 2 weeks for 12 weeks a high level of mortality has been observed. The impact in the field has been as follows –

Defoliation	Biomass Reduction	Root Mass Reduction
Every 8 weeks	49%	70%
Every 4 weeks	92%	96%

The researchers suggest that if there was a lack of water then the results could be worse. An incomplete analysis showed the willows involved in river protection and soil conservation in the Wellington Region have a replacement value of approximately \$10m. Wairarapa staff estimate that the value of willows could be \$200m across all of New Zealand.

- (b) The biology of the sawfly. This reveals that the number of generations per year is almost entirely dependent on temperature. Larvae stop growing at temperatures below 8°C. On average temperature data five generations are possible in the Wellington Region. The female has an average lifespan of 5 days laying 50 eggs. This explains the ability of the sawfly to create rapid defoliation.
- (c) Are any willow species resistant to sawfly? Larvae develop at different rates dependent on the willow species varying from 18 to 26 days. The willow species also affects the fecundity of the sawfly. *Salix pentandra* slows down the development of the sawfly and fewer eggs are produced. Chemicals such as phenolglucosides appear to slow larval development and result in fewer eggs per female. Also sawflies did not develop successfully when the leaves had been damaged by two-spotted mites. This may be due to picein. Recently imported Californian tree willows are promising due to either their earlier leaf bud or longer leaf retention. None of those imported species have suffered serious defoliation.
- (c) Alternative species. A literature search has suggested the following species:

Exotic species		Native species	
<i>Alnus glutinosa</i>	Black Alder	<i>Leptospermum scoarium</i>	Manuka
<i>Casuarina cunninghamiana</i>	River she-oak	<i>Kunzea ericoides</i>	Kanuka
<i>Casuarina glauca</i>	Swamp she-oak	<i>Phormium tenax</i>	Flax
<i>Cornus baileyi</i>	Bailey's dogwood	<i>Cordyline australis</i>	Cabbage Tree
<i>Cornus stolonifera</i>	Red osier dogwood	<i>Cortaderia fulvida</i>	Toetoe
<i>Corylus avellana</i>	Hazelnut	<i>Pittosporum</i> species	
<i>Cupressus macrocarpa</i>	Macrocarpa	<i>Hebe</i> species	
<i>Elaeagnus angustifolia</i>	Russian olive	<i>Macropiper excelsa</i>	Kawakawa
<i>Lupinus arboreus</i>	Tree Lupin	<i>Sophora microphylla</i>	Kowhai
<i>Tamarix chinensis</i>	Tamarix	<i>Fuchsia exorticata</i>	Tree Fuschsia
		<i>Brachyglottis repanda</i>	Rangoria
		<i>Dacrycarpus dacrydioides</i>	Kahikatea
		<i>Cyathea dealbata</i>	Ponga
		<i>Carex secta</i>	Native Sedge

Willows resistant to willow sawfly are suggested as being a more immediate solution to riverbank stabilisation, while the long term establishment of mixed exotic-endemic planting regimes is seen as being desirable for enhancing biodiversity and aesthetic appeal along New Zealand riverbank environments.

4. Future Research

HortResearch wish to proceed with the screening of 18 species. Increased contributions to the research have been agreed from several regional councils. This Council is contributing \$33,500 from Wairarapa and Landcare. Based on the results, it is hoped to be able to develop a targeted breeding programme.

5. Communications

It is proposed to prepare an article for Elements later this year.

6. Conclusion

Willows remain an important tool in river and land management. Further research may assist in the identification of resistant species. Over time it is likely that a mixture of exotic and native species will be required.

7. Recommendation

That the report be received.

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