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factsheet

Update on leaf-feeding willow sawfly:

the arrival of *Nematus oligospilus* in Australia



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Background

Willow sawfly

Two species of willow sawfly have been known from Australia since 1994, the willow gall or bean gall sawfly *Pontania proxima*, and the willow bud sawfly *Amauronematus viduatus*, both accidentally introduced from the northern hemisphere (Naumann *et al.* 2002).

Leaf-feeding willow sawfly

The leaf-feeding willow sawfly is a new introduction to Australia, first recorded here in 2003 though the identification has only been confirmed this year. It is also native to the northern hemisphere, where it is found from Ireland through continental Europe to the Himalayas, and also occurs in North America from Alaska to Mexico. It was first recorded in the southern hemisphere in Argentina in 1980, in southern Africa in 1993/94 and in New Zealand in 1997.

Biology

Eggs are laid and larvae feed on the leaves. Pupation takes place in cocoons on the tree or in the soil under trees. Winter is passed as diapausing mature larvae or pre-pupae in cocoons. The southern hemisphere populations reproduce asexually and males have never been seen; this promotes rapid spread and increase of populations.

Impact in the southern hemisphere

In the southern hemisphere countries, the sawfly has caused widespread defoliation of willow trees when first observed, and spread very fast, covering all of New Zealand within ten years. Several species of *Salix* are attacked, including crack willow, weeping willow, pencil willow and golden willow. It seems likely that all tree willows in the subgenus *Salix* will be attacked but not *Populus* species.

Arrival in Australia

The introduction of biological control agents into Australia is a rigorous and lengthy process in place to protect Australia's unique and valuable environment and agricultural systems.

However, it is not known how willow sawfly reached Australia, but it is likely to have come from New Zealand where it has been widespread in the North Island for at least eight years. It may have come over as pupal cocoons in willow foliage in cut flowers which were inadequately treated or inspected. Given that cocoons can form in any loose material they may have attached to packaging or other materials. Alternatively it is possible that adults were blown across the Tasman in the easterly wind systems associated with major cyclonic weather patterns in late summer.



Adult willow sawfly
Photo: http://www.hortnet.co.nz/publications/guides/willow_sawfly/wsawfly.htm

As it is now present in the ACT, southern New South Wales and the Adelaide hills, eradication is out of the question. It can be expected to turn up in Victoria and Tasmania fairly soon, and eventually in Western Australia.

Impact in Australia

The extent of defoliation in particular years will probably depend on climatic conditions. In warm conditions, the sawfly can have up to four generations per season, but may be stressed by dry seasons. There is no information on the sawfly's ability to tolerate high summer temperatures. Climatic predictions would require accurate distribution information from the northern hemisphere, eg the exact localities in Mexico and the USA where it is found, with their altitude.

However, it is likely that *N. oligospilus* is a complex of sibling species which may have different climatic tolerances, so

any distribution information from the northern hemisphere may not refer to the subspecies present in Australia. In practice, therefore, the northern limits of this species in Australia cannot be predicted without laboratory experiments to determine the upper temperature thresholds of the subspecies found here.

Native parasites and predators

It is also impossible at this stage to predict whether native parasites and predators will transfer over to attack this species. There are very few native Australian species in this sawfly group (Tenthredinidae) (Naumann *et al.* 2002) so there is probably only a small pool of parasites available. However, there may be generalist parasites and predators that will attack this species. If there is significant attack, this may limit the populations and, therefore, impact of the sawfly.

It would be useful to start gathering some information on parasitism and predation of the different life stages (egg, larvae and pupae) in the different regions of Australia.

Implications for land managers

If the New Zealand experience is repeated here, we can expect severe defoliation of most species of tree willows each summer, with effects

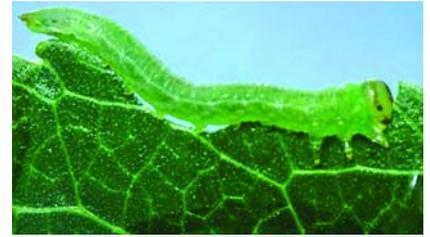
greatest in cool wet summers and least in hot dry summers. Large trees will not be killed but are likely to suffer severe defoliation, which may ultimately kill trees if repeated over several years. Smaller trees and seedlings may be killed.

Impact on willows

Some willows, including crack willows and weeping willows, are serious weeds and willows are one of the 20 *Weeds of National Significance* or WONS. Damage to these will be highly beneficial and will support and assist the efforts of local government, regional groups, and landcare and rivercare groups to control and destroy willow infestations.

However, rapid defoliation of willows in mid-summer leads to loss of shade and, where willows are the only tree along river banks, may cause increased water temperatures in summer. Defoliation will also reduce the effectiveness of foliar spray herbicide treatments used to control willows, though stem injection, basal bark and cut stump treatments should not be affected. On the other hand, severe willow defoliation will also create an opportunity for rivercare groups to gradually replace willows through plantings of native trees under and among the willows.

Where willows are valued or heritage trees, such as old weeping willows in



Larva (15 - 20 mm when fully grown)

Photo: D Allan

http://www.hortnet.co.nz/publications/guides/willow_sawfly/wsawfly.htm

some districts, it may be necessary to use insecticide treatments to protect the trees. Any treatments should be applied early in the summer as soon as the first larvae appear (probably October) as treatments are not effective once heavy defoliation is already present. Unfortunately if defoliation occurs every year, annual treatment will also be necessary. If this happens, in the long term land owners might be advised to replace the willow trees.

Reference

Naumann ID, Williams MA & Schmidt S. 2002. Synopsis of the Tenthredinidae (Hymenoptera) in Australia, including two newly recorded, introduced sawfly species associated with willows (*Salix* spp.). *Australian Journal of Entomology* **41**, 1-6.

Pictures and more information are available from HortResearch on www.hortnet.co.nz/publications/guides/willow_sawfly/wsawfly.htm.

For further information visit the Weeds CRC's website: www.weeds.crc.org.au

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