

Adapting willow management strategies to deal with spread of the willow sawfly

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Research scope

The recent arrival of willow sawfly (*Nematus oligospilus*) in south-eastern Australia has implications for willow management. The larvae of willow sawfly eat willow leaves, preferring tree willows to shrub willows, and large populations of the insect can defoliate entire trees. As the life cycle of willow sawfly can be completed in four weeks in ideal conditions, there is potential for multiple defoliation events each season. In New Zealand, it has been observed that if willow trees are defoliated more than three times each season for two or more seasons, then tree death is highly likely. Fewer defoliation events can also kill trees.

In order to further understand the potential impact of willow sawfly on willows a three year research project started in April 2006, funded by Victorian state government bodies. Intensive monitoring of eight field sites in north-east Victoria and West Gippsland includes regular measurements of tree canopy cover, leaf area, extent of defoliation and willow sawfly population abundance. The willows being monitored are predominantly *Salix fragilis* (crack willow, six sites), although one site contains *S. alba* var. *vitellina* (golden willow) and another contains *S. x rubens* (golden x crack). In addition, other willow taxa are monitored regularly for the abundance of willow sawfly and extent of defoliation.

Results to date

The first tree defoliation event observed occurred in the Kiewa Valley, north-east Victoria in November 2006. Willow sawfly population levels were extremely high at this time, with all stages of the life cycle present. Willows in the Kiewa Valley were noticeably defoliated in the 2005/06 season, and it is likely that this area currently has the highest willow sawfly population levels of anyway in Victoria. The affected trees have regrown new leaves, but as larvae has been present at the site throughout the season, discrete defoliation/refoliation events have not be readily observable.

Low levels of willow sawfly have been found at the remaining seven intensively monitored sites, providing new records for the distribution of the insect. However, tree defoliation has not been observed at any of these sites.

In addition, new willow sawfly outbreaks have been reported in Victoria on the Campaspe River, Kyneton; Goulburn River, Seymour; Broken River and nearby creeks, Swanpool; and Tarago River, Drouin. In NSW willow sawfly has been confirmed as far north as Armidale and in several sites around the Bathurst-Lithgow region.

So far this season the insect has been found on *S. fragilis*, *S. x rubens*, *S. alba* var. *vitellina*, *S. nigra*, *S. matsudana* hybrids, *S. babylonica*, *S. x sepulcralis*, *S. humboldtiana*, *S. purpurea*, and *S. cinerea* (found on this species at one site only out of nine sites regularly monitored).

Implications for management / research gaps

If willow sawfly population levels increase to levels where repeat defoliations of large numbers of willows occur, then tree deaths are likely. The implications for willow managers include managing the consequences of tree death (debris, dangerous branches/trees) and the loss of willow in situations where they provide stability to river banks. If large stretches of willows are killed rapidly, it will be difficult to replace them with other vegetation in a short time frame.

If willow sawfly does have a significant effect on the number of tree willows in the environment, it may be possible that resources can be shifted to managing shrub willows, or to different areas where willow sawfly is less effective.

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Further work needed / gaps

- ◆ Effect of willow sawfly on tree growth (stems included in this project, roots are not)
- ◆ Willow taxa preference of willow sawfly in Australia
- ◆ Factors that influence development of willow sawfly population
- ◆ Time lag between initial willow sawfly arrival and eventual tree death
- ◆ Relationship between willow sawfly populations and tree deaths
- ◆ Effect of willow sawfly on ecosystem components (e.g. bird and insect communities, water quality)

Related publications

A report reviewing the literature and anecdotal accounts of willow sawfly both in Australia and New Zealand was completed in July 2006. It can be found at: http://www.weeds.org.au/WoNS/willows/docs/Willow_Sawfly_Status_Report_July_2006.pdf

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