

Plant & Food Research update

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On-farm field trials of willow trees have been established to look at the impact of the giant willow aphid on willow tree health in the Hawke's Bay and Wairarapa regions. The field trials are located on sheep and beef farms, in erosion control plantings of willow trees in gullies on hillsides (Figures 1 and 2). They include newly planted poles, and two and three year-old trees of *Salix matsudana*, and *S. matsudana* x *alba* 'Moutere' and 'Tangoio'.



Figure 1. Willow trees at Porangahau in Hawke's Bay, planted in the winter of 2016.



Figure 2. Two year-old willow trees at Bideford in the Wairarapa.

The field trials were established in early summer, and the willow trees were allocated to sprayed and unsprayed treatments, with insecticide applied monthly when the trees were monitored for aphids. Initial findings showed a rapid increase in the numbers of trees infested with aphids from very low numbers in January to high numbers in February and March (Figure 3). The size of the aphid clusters on the tree stems increased rapidly in February, March and April, and then declined substantially, in both size and number, in May.

The sprayed trees were quickly re-infested by winged aphids in February, March and April, with the sprayed and unsprayed treatments having similar numbers of infested trees one month after spraying. However, the sprayed trees had smaller aphid clusters and much reduced stem blackening (mould) compared with the unsprayed trees (Figure 4). The re-infestation of willow trees declined substantially in May, with only a small number of winged aphids and small clusters seen on the sprayed trees.

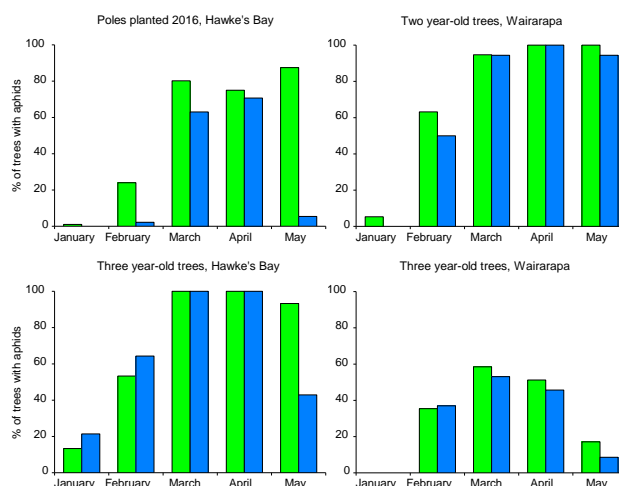


Figure 3. The percentage of sprayed and unsprayed willow trees infested with giant willow aphids in the Hawke's Bay and Wairarapa field trials. Legend: ■ unsprayed trees, ■ sprayed trees.



Figure 4. The blackened stem of an unsprayed 'Tangoio' willow tree (left) and the adjacent sprayed tree (right), in May 2017.

There was no significant difference in the diameter and height growth of the sprayed and unsprayed willow trees, from December 2016 to July 2017 (Figures 5 and 6). The growing conditions were particularly good in the Hawke's Bay and Wairarapa regions, with regular rainfall and no prolonged periods of drought. The survival of the willow poles planted in the winter of 2016 was high at 98-100%, and there was no mortality of the two and three year-old trees.

The willow cultivars had significant differences in diameter and height growth, but this was related to their location on the farms. The *Salix matsudana* and 'Moutere' cultivars were planted lower on the hillsides where the soils are deeper, while the more drought tolerant 'Tangoio' cultivar

was planted higher on the hillsides, where less soil moisture is available, and the growth was slower.

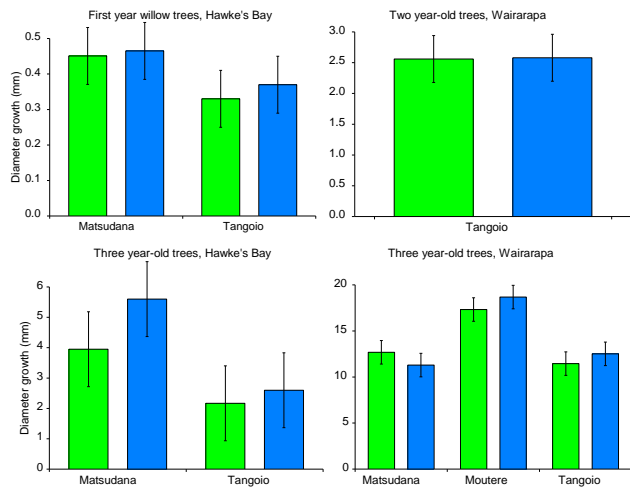


Figure 5. The diameter growth of the willow trees of each cultivar in the Hawke's Bay and Wairarapa field trials. The error bars are the standard errors of the means. Legend: ■ unsprayed trees, ■ sprayed trees.

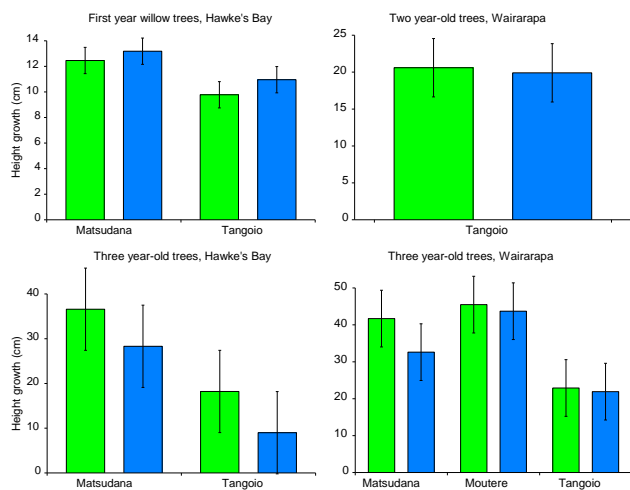


Figure 6. The height growth of the willow trees of each cultivar in the Hawke's Bay and Wairarapa field trials. The error bars are the standard errors of the means. Legend: ■ unsprayed trees, ■ sprayed trees.

The on-farm field trials will continue for the 2017-2018 growing season, to look at the longer term effects of the giant willow aphid on willow tree growth and survival.