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# Seasonal abundance of the giant willow aphid in the National Willow Collection

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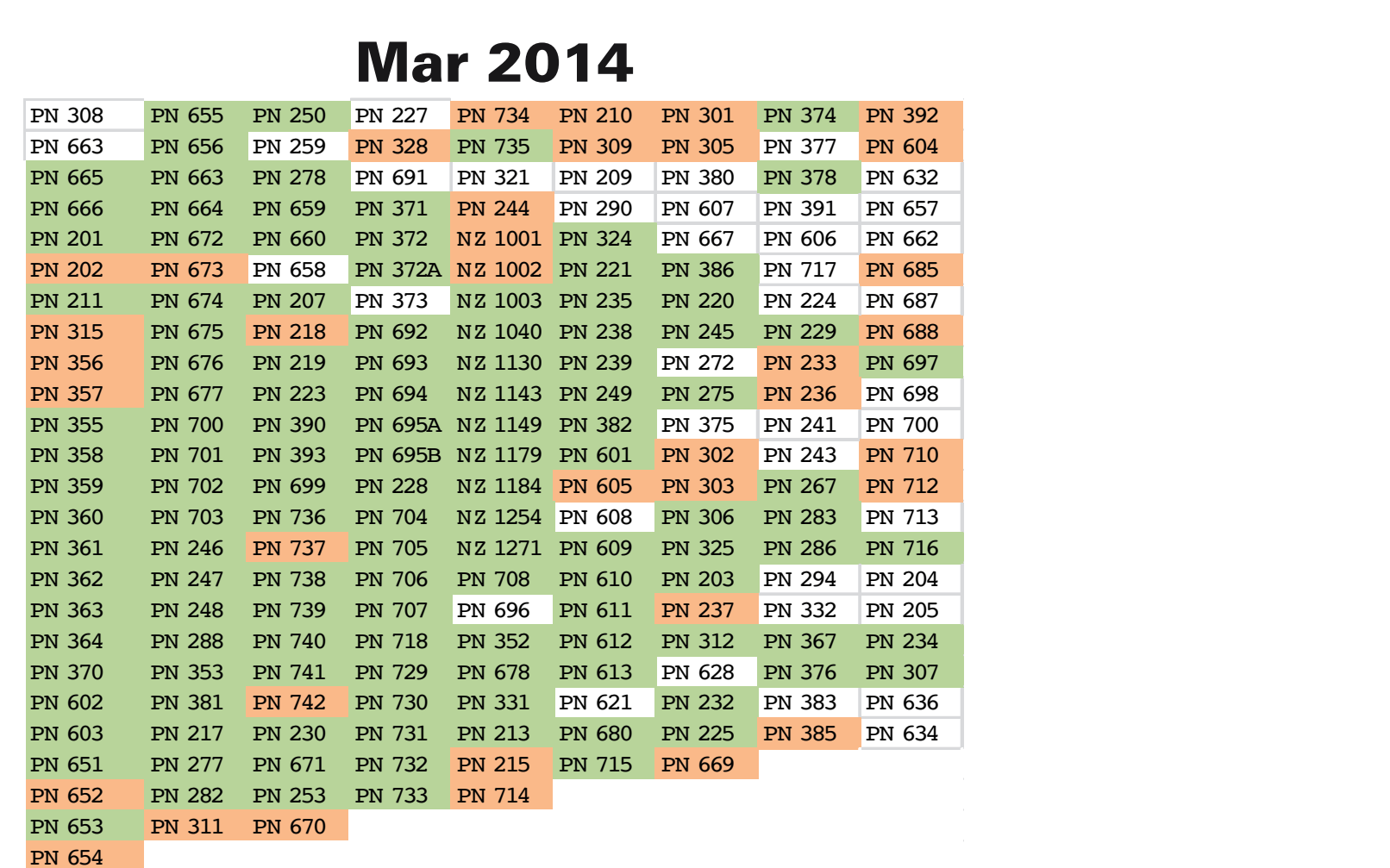
## Introduction

Willows are key sources of spring pollen and nectar for honey bees, and are hosts to the giant willow aphid (*Tuberolachnus salignus*), a recent insect arrival first found in New Zealand in December 2013. This aphid forms dense colonies on the stems of willow trees, and produces large quantities of willow honeydew, which is an emerging issue for beekeeping, because the honeydew makes the honey very difficult to extract and boosts wasp populations that attack honey bees.

The giant willow aphid was first detected in the National Willow Collection at Aokautere in February 2014. The collection contains 167 willow clones, comprising 30 species and 13 hybrids, in a block of nine rows of trees, and has been monitored at monthly intervals since February 2014 for the presence of the aphids.

## Results

The degree of infestation of the willow clones with aphids was low during the first season from February to April 2014, with the abundance of aphids peaking in March 2014, with 22% of willow clones infested (Figure 1). Then in April 2014 the aphids disappeared.



**Figure 1:** The distribution of giant willow aphids on willow clones in the National Willow Collection during the first season in March 2014. See Figure 2 for the legend.

The aphids re-appeared in January 2015, and quickly spread throughout the collection in February and March, with the abundance of aphids peaking in March 2015, with 77% of willow clones infested (Figure 2). The aphids declined noticeably in April, with 30% of willow clones infested.

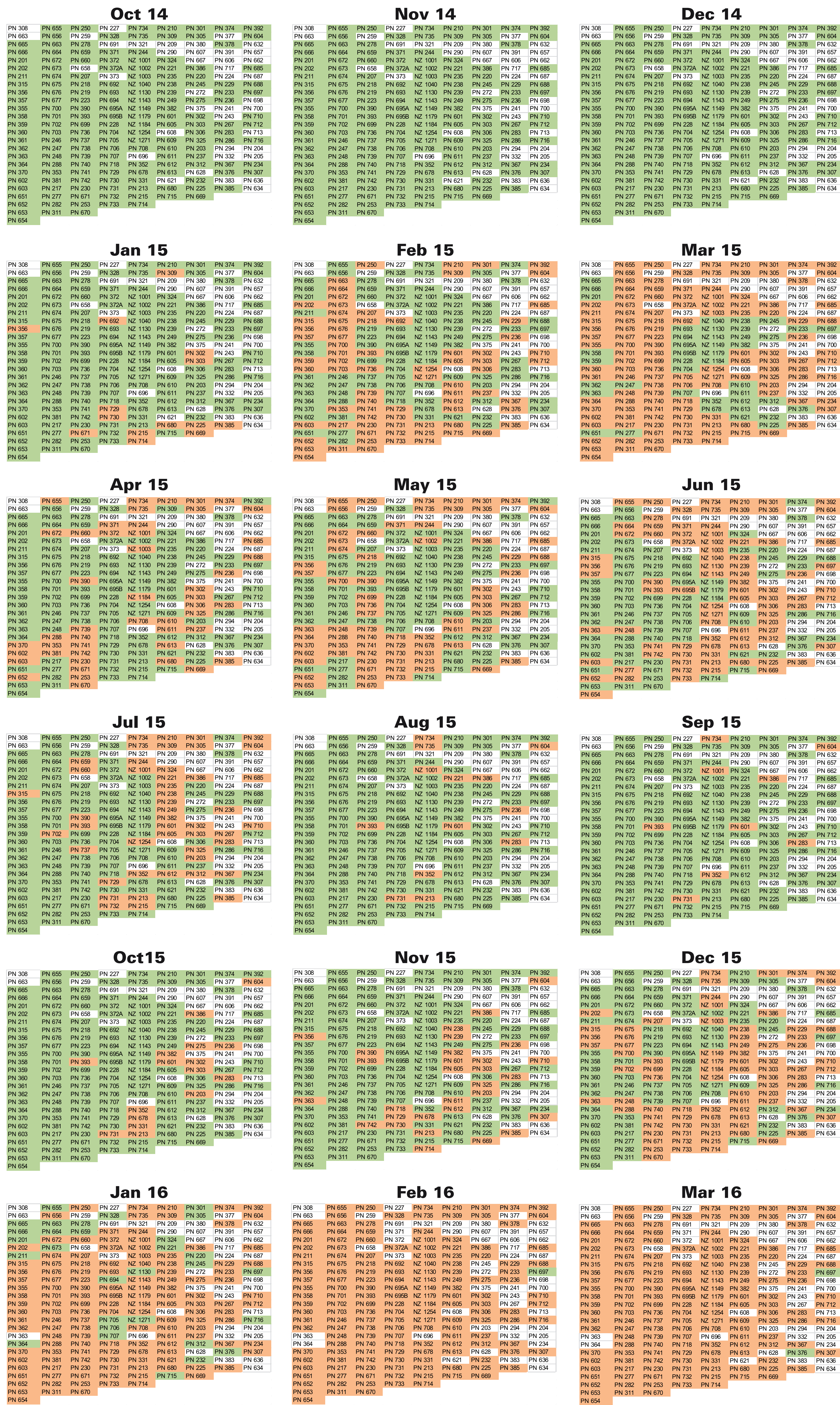
The aphids fluctuated in abundance with warm and cold weather during May and June, then declined to very low numbers in winter, persisting from August to October 2015 as small clusters on the stems of 8% of the willow clones.

The aphids slowly increased in abundance in November 2015, with 20% of willow clones infested, and more rapidly in December 2015, with 54% of willow clones infested. The degree of infestation in December 2015 was two months ahead of that in the previous season, as the result of aphids overwintering in the collection.

The infestation reached 99% of willow clones in February and March 2016. The number of aphids on trees was observed to vary widely for the willow clones, with branch dieback and tree deaths observed in shallow-rooted shrub willow clones that had large numbers of aphids during dry conditions in March 2016.

## Conclusions

The seasonal abundance of the giant willow aphid has increased in the three seasons since its arrival in New Zealand. The aphid is showing seasonal adaptation to New Zealand conditions, with greater numbers of aphids overwintering, and populations increasing more rapidly in spring and early summer.



Legend:  Aphids on trees  No aphids on trees  No live trees

**Figure 2:** The distribution of giant willow aphids on willow clones in the National Willow Collection. The willow clones consist of three tree row plots in the nine rows of trees, with each willow clone shown as a separate cell, labelled with the clone register number.