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The Effect of Density of the Psyllid *Aphalara itadori* on Oviposition Patterns on Japanese knotweed, *Fallopia japonica*

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Introduction

Japanese knotweed (*Fallopia japonica*)
- large, perennial invasive plant (Fig 1)
- affects temperate ecosystems
- infestations can: out-compete native vegetation, decrease stream flows, and damage man-made structures (Fig 2)

Psyllid *Aphalara itadori*
- sap-feeding insect (Fig 3)
- native to Japan
- potential biological control agent for *F. japonica* (Fig 4)

Purpose

Determine how densities of the adult psyllid *A. itadori* affect oviposition patterns on *F. japonica* in order to help predict psyllid distribution and impact in the field.

Fig 1. *F. japonica* infestation.

Fig 2. *F. japonica* growing up through asphalt.

Fig 3. *A. itadori* on *F. japonica* inflorescence.

Fig 4. Damage to *F. japonica* caused by *A. itadori.*

Materials and methods

- Two *A. itadori* density treatments (Fig 5)
  - 20 psyllids / cage (LOW density)
  - 80 psyllids / cage (HIGH density)
  - 12 replicates of each treatment
- Two single-stemmed, four-leafed *F. japonica* plants per cage (Fig 6)
- Psyllids released in cages for 48 hours
- Eggs on *F. japonica* plants counted at the end of the 48 hour period
- Aggregation was measured by comparing the distribution of eggs on the two plants within a cage between treatments

Fig 5. Arrangement of trial plant cages.

Fig 6. Single-stemmed, four-leafed *F. japonica* plant.

Results

Eggs were significantly more aggregated (P = 0.021, df = 21; Fig 7) in the low density treatment compared to the high density treatment (LOW: mean of 86% of eggs laid on one plant vs. HIGH: mean of 65%)

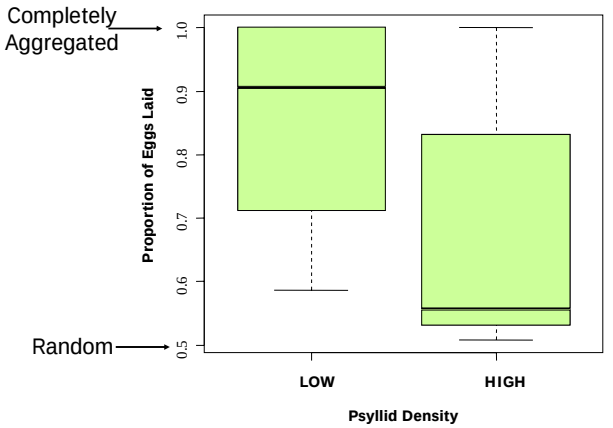

Fig 7. Median proportion of eggs laid on the plant with a higher density of eggs.

Conclusions

At a lower psyllid density there was significantly more aggregation of eggs on a single plant than in the higher density treatment.

These results suggest that when *A. itadori* is released, initially low densities will produce clumped damage on a few plants within a patch whereas a higher density would produce uniform damage across a patch of *F. japonica.*

This aggregation behaviour will make detection of establishment for *A. itadori* populations difficult – releasing high numbers of psyllids on small patches might improve detection

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