A New Agent for the Biological Control of Invasive Knotweeds: The Psyllid *Aphalara itadori*

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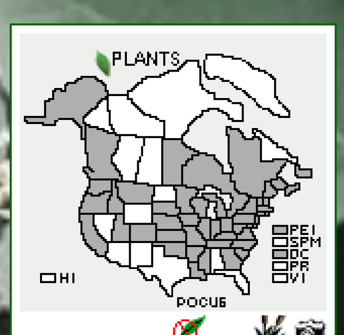
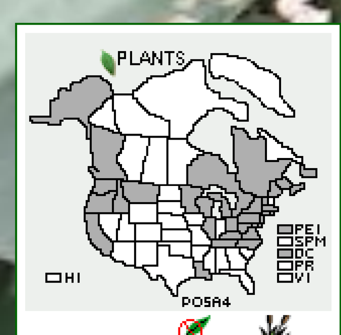
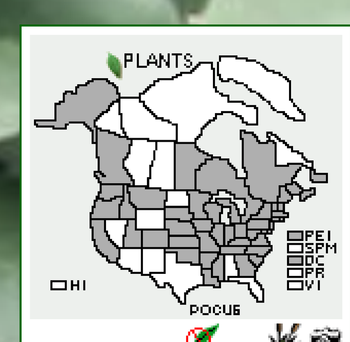
Introduction

- Three invasive knotweed species are large perennial exotic invaders in the UK, North America, and large parts of Europe
- Knotweeds cause problems in natural riparian habitats and urban settings where infestations out-compete native vegetation, decrease stream flows, and can damage infrastructure

Japanese	Giant	Bohemian
Fallopia japonica	*F. Sachalinensis*	*Fallopia x bohemica* (hybrid of JK + GK)





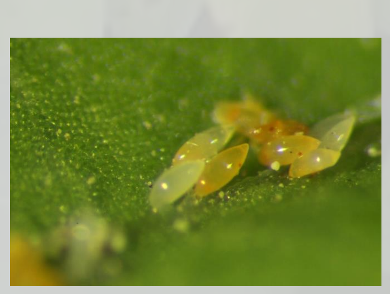


Two *A. itadori (Homoptera: Psyllidae)* populations:

- A northern population which performs well on Giant knotweed.
- A southern population which performs well on Japanese.
- Approved for open release in Canada in summer 2016 by the Canadian Food Inspection Agency (CFIA)

Purpose

- Help populations of *A. itadori* establish in Canada.
- Experiment with age and/or damage to knotweed to improve timing or pre-management for releases



Results

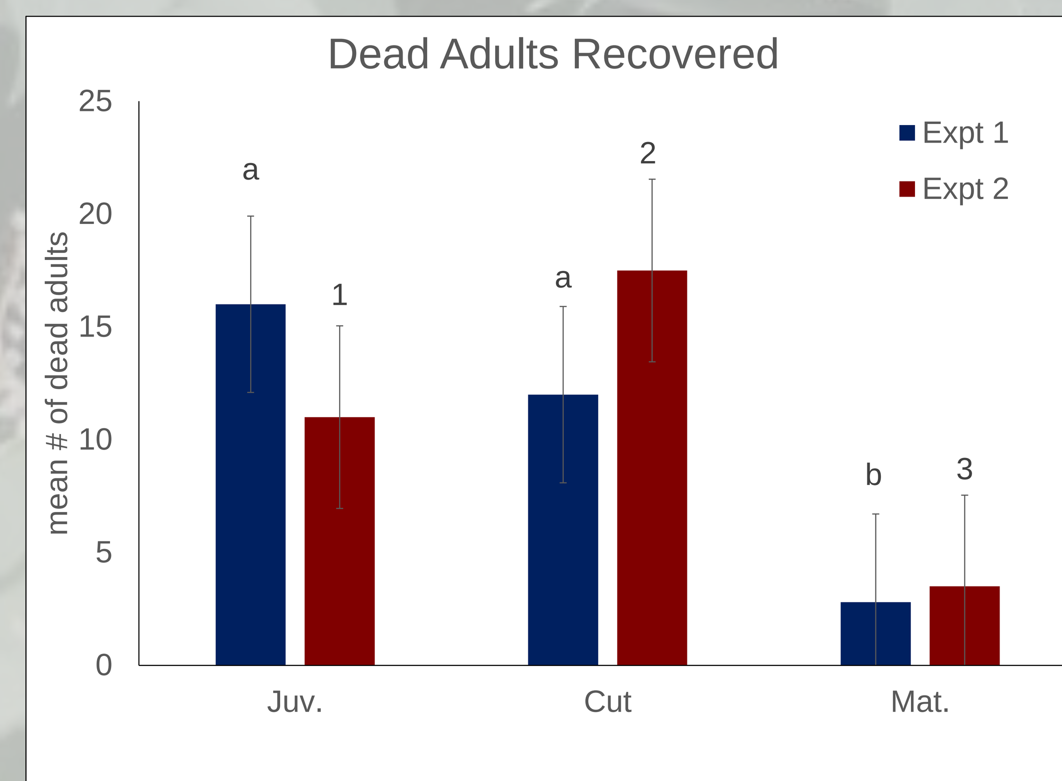


Figure 1:Comparison of mean mortality of adult psyllids with SE after 96h for each treatment on host plants (juv=juvenile, mat=mature). Different letters and numbers represent significant differences for treatments within each experiment ($p<0.05$). Asterisks represent significant differences between treatments of an experiment

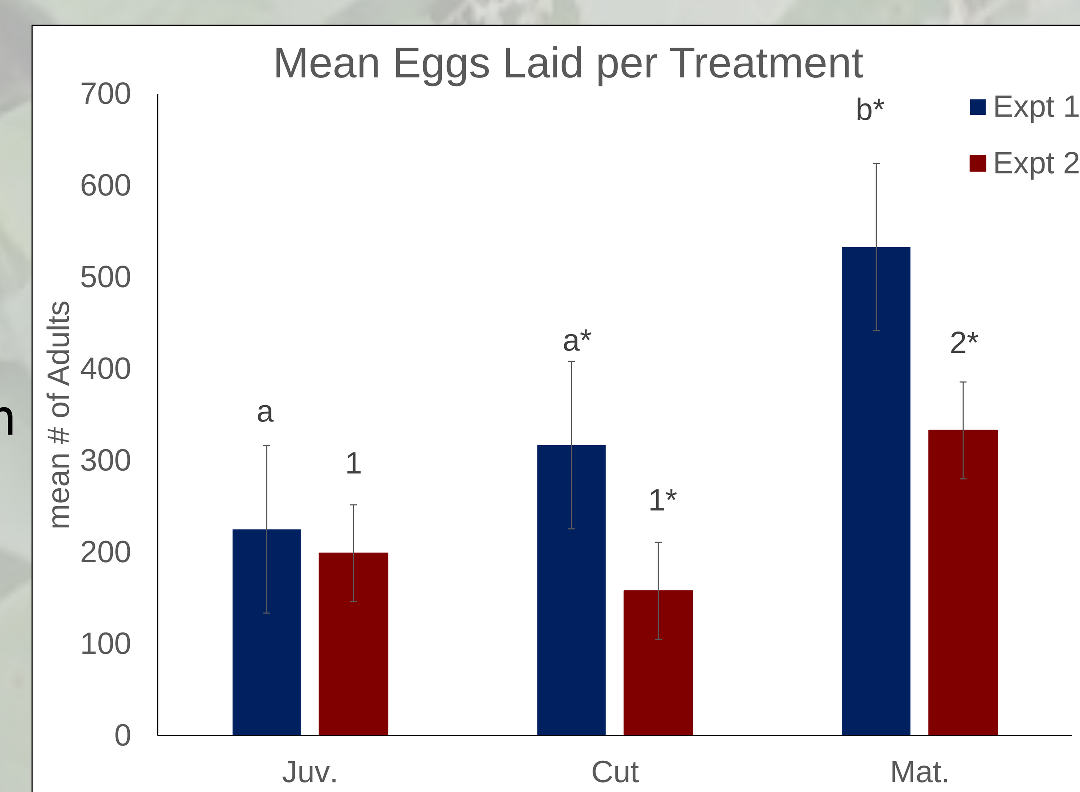


Figure 2:Comparison of mean total eggs laid by introduced psyllids at the end of 96h exposure period.

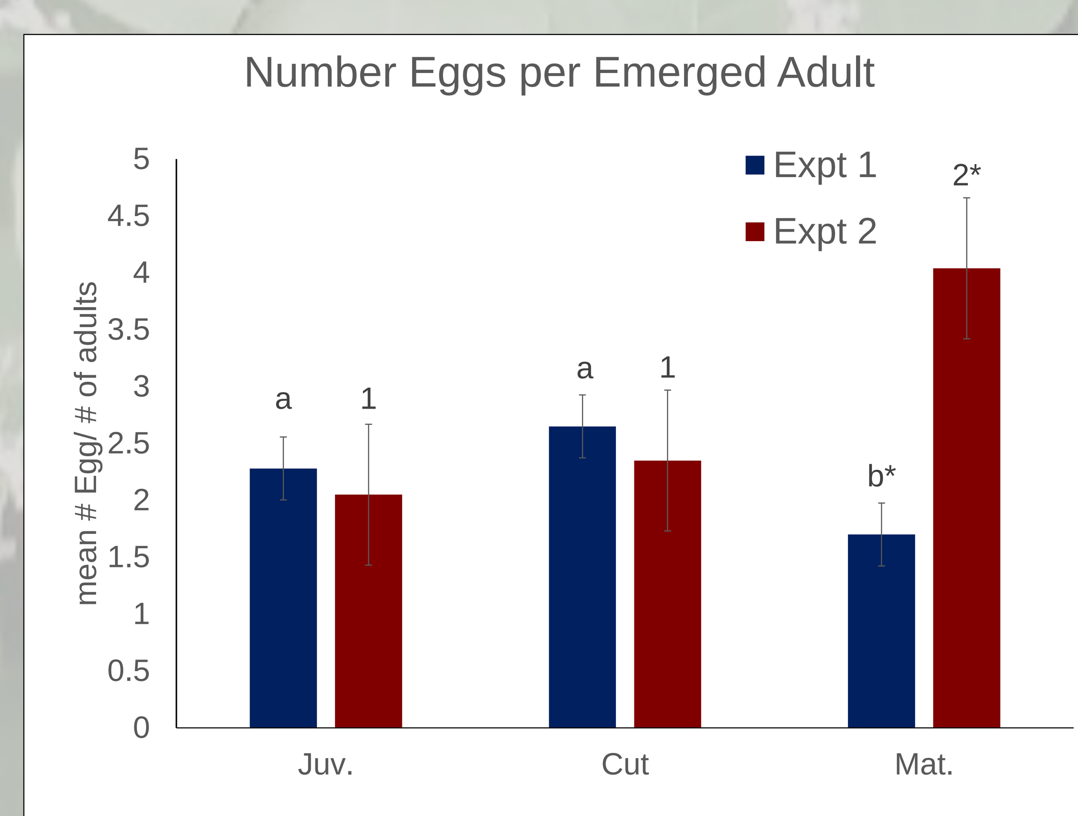


Figure 3: Comparison of the mean ratio of emerged F1 adults to eggs laid. Different letters represent a significant difference between treatments ($p<0.05$)

Materials and methods

- Experiments used Kyushu biotype and their preferred host Japanese knotweed
- Three treatments each with 6 reps on Japanese knotweed: (1) potted and grown for two weeks (juvenile) (2): grown for four weeks, cut to soil surface, and regrown for two weeks (cut), and (3): grown for six weeks (mature)
- In containment facility, each caged knotweed plant exposed to 20 ♀ + 20 ♂ psyllids for 96 hrs, then psyllids removed
- Psyllid eggs counted after 96 hrs, plants held at 22ºC for F1 adult emergence
- Adults counted weekly for 4 weeks after start of emergence
- Entire experiment was repeated after F1 adults finished emerging

Discussion /Conclusions

- Large numbers (over 50% in some cases) of the 20 ♀ + 20 ♂ psyllids introduced to the treatment plants died by the end of the 96h exposure period in both experiments, but only in cut and juvenile treatments.
- Possible causes could either be a strong defensive response from the host plant and/or willful starvation in an attempt to escape undesirably dense conditions (i.e. 40 individuals in a small cage)
- **Research is ongoing on how to best establish populations, but this bug will eventually become one of the tools we can use to help curb the spread of invasive knotweeds in Canada**

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References: Knotweed range maps from USDA Plant Database.

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