Population differences in male tarnished plant bug response to female pheromones

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Introduction

Pheromones are species-specific chemical signals used to communicate.

Environmental conditions influence the predisposition to respond to pheromones. As a result, **population differences** may emerge.

Male **tarnished plant bugs** (*Lygus lineolaris)* are attracted to a **sexual pheromone** emitted by females.

We investigated **population differences** in male **responsiveness to female pheromones** in two tarnished plant bug populations from Ontario and Quebec using a **Y-olfactometer**.

Methods

Insects

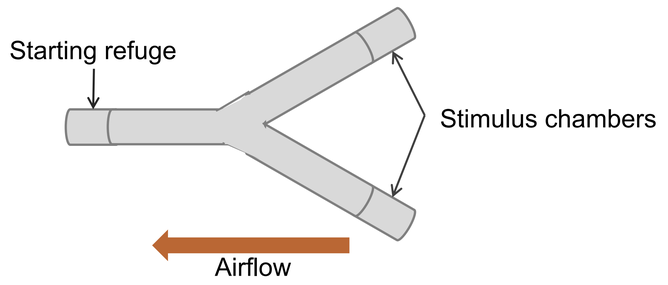
We collected insects from cultured fields at Ridgetown, Ontario and Mirabel, Québec in 2018.

We fed insects with washed romaine lettuce on a 12:12 light cycle at ±26°C and 50% humidity. We collected eggs twice a week.

We anesthetised insects in a freezer, sexed them, and tagged the males using acrylic paint.

Olfactometry experiment

During the olfactometry test, each male had up to 600s to navigate the apparatus.

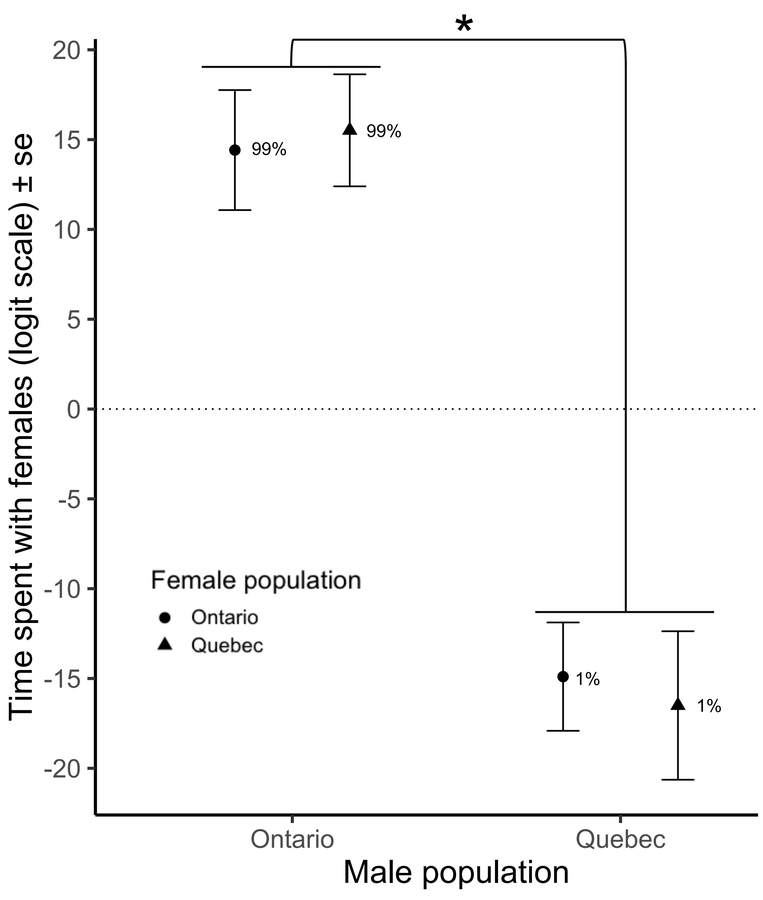


We counted the number of seconds spent in each arm during four days:

Day 1 – Control. No stimulus in the olfactometer
Days 2 & 3 – 3 ♀ vs. 0 ♀ . Three females of one population in one arm, and nothing in the other. Each male was exposed to both population, in a random order.
Day 4 – 3 ♀ vs 3 ♀. Three females of one population in one arm, and three females of the other population in the other arm.

Results

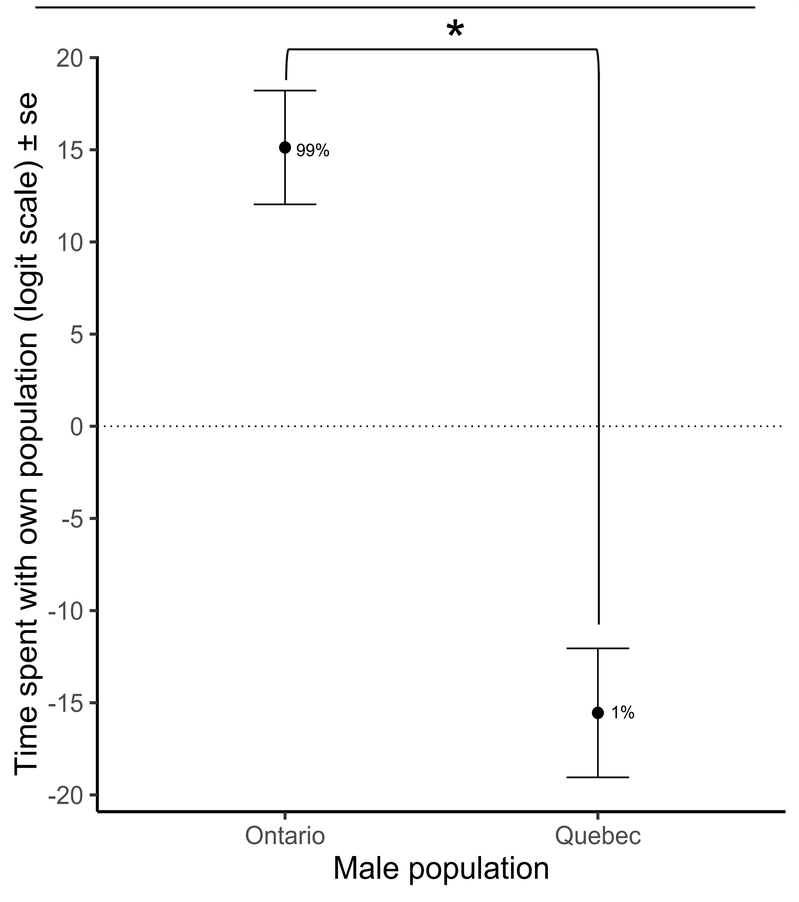
3 ♀ vs 0 ♀



Males from **Ontario** largely **preferred** the arm with females over an empty arm regardless of the population.

Males from **Quebec avoided** the arm with females regardless of the population.

3 ♀ vs 3 ♀



Males from **Ontario** and from **Quebec preferred** females from **Ontario** when given the choice between females from the **two populations**.

There is no difference between populations in the total time spent in the arms.

Conclusions

Populations **differ** in male responsiveness to female pheromones.

Males from **Ontario** were **attracted** to females of both populations, but **preferred their own population** when given the choice.

Males from **Quebec avoided** females of both populations and spent their time in the empty arm, but when forced to make a choice, **preferred** females from **a different population.**

Our results **validate** our olfactometer for the tarnished plant bug, and suggest important **population differences** in the response to sexual pheromones.

This experiment is part of a larger project on the ecology and evolution of the tarnished plant bug: see **poster 27**!

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