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Efficiency of indigenous *Nabis americoferus* against tarnished plant bug and aphids in greenhouse

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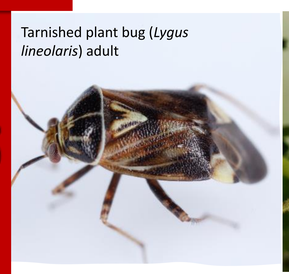
Context & Objectives

The damsel bug, *Nabis americoferus* (Carayon) (Hemiptera: Nabidae) is a polyphagous predator indigenous to North America and commonly found in many crops. *Nabis* species can feed on several important agricultural pests such as the tarnished plant bug (TPB), *Lygus lineolaris* (Palisot de Beauvois) (Hemiptera: Miridae) or aphids such as *Myzus persicae* (Sulzer) and *Aphis gossypii* (Glover) (Hemiptera: Aphididae). Both insect groups are pests of greenhouse crops and can impede high economic damage.

This project aims:

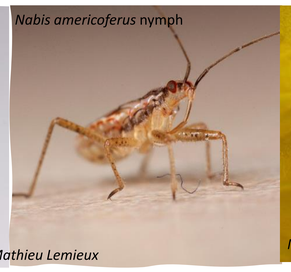
1) **to explore the efficiency of *N. americoferus* as a biocontrol agent in cucumber greenhouses against tarnished plant bug and melon aphid**
2) **To evaluate the impact of multiple preys on population of *N. americoferus***

Methodology


Tarnished plant bug (*Lygus lineolaris*) adult

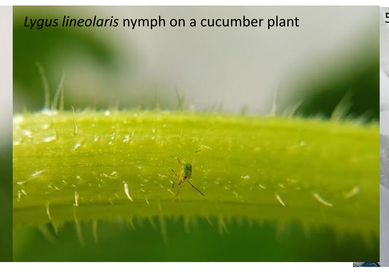

Melon aphid (*Aphis gossypii*)


Nabis americoferus adult


Nabis americoferus nymph

Photos by Mathieu Lemieux


Nabis americoferus nymph


Lygus lineolaris nymph on a cucumber plant


5 plants of cucumber by cages


Experimental set-up in greenhouse

- Two experiments in 2019 and 2020
- 5 plants of cucumber in muslin cages in greenhouses
- 5 treatments replicated 20 times
- 3 leaves on 3 cucumber plants/cages observed each week during 6 weeks
- Nb of insects and developmental stage noted

Treatments

1) 10 adults *L. lineolaris* (5♂,5 ♀)
2) 10 adults *L. lineolaris* (5 ♂,5 ♀) + 5 aphids (1/plant)
3) 4 adults *Nabis* (2♂, 2♀) + 5 aphids (1/plant)
4) 10 adults *L. lineolaris* (5♂, 5 ♀) + 4 adults *Nabis* (2♂, 2♀)
5) 10 adults *L. lineolaris* (5♂, 5 ♀) + 4 adults *Nabis* (2♂, 2♀) + 5 aphids (1/plant)

Results

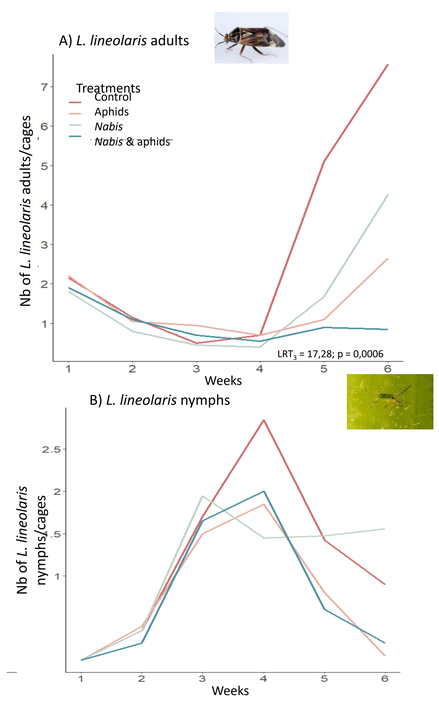


Figure 1. Impacts of the presence of aphids or *Nabis* on *L. lineolaris* adult (A) of nymphs (B) abundance.

- Reduced abundance of adults *L. lineolaris* in presence of *Nabis* and aphids
- No impacts of the presence of aphids or predator on *L. lineolaris* nymphs abundance

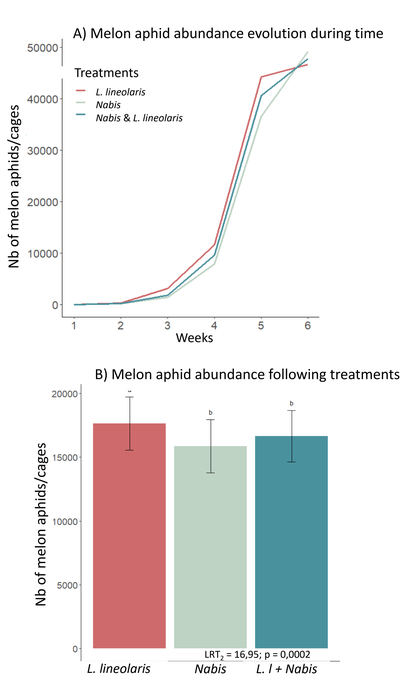


Figure 2. Aphid abundance during the experiment (A) and following the presence of *L. lineolaris (L.l)*, *Nabis* or both (B)

- Significant ↓ of global abundance of melon aphids in presence of *Nabis* or *L. lineolaris* + *Nabis*
- *Nabis* did not reduce melon aphid below economic threshold

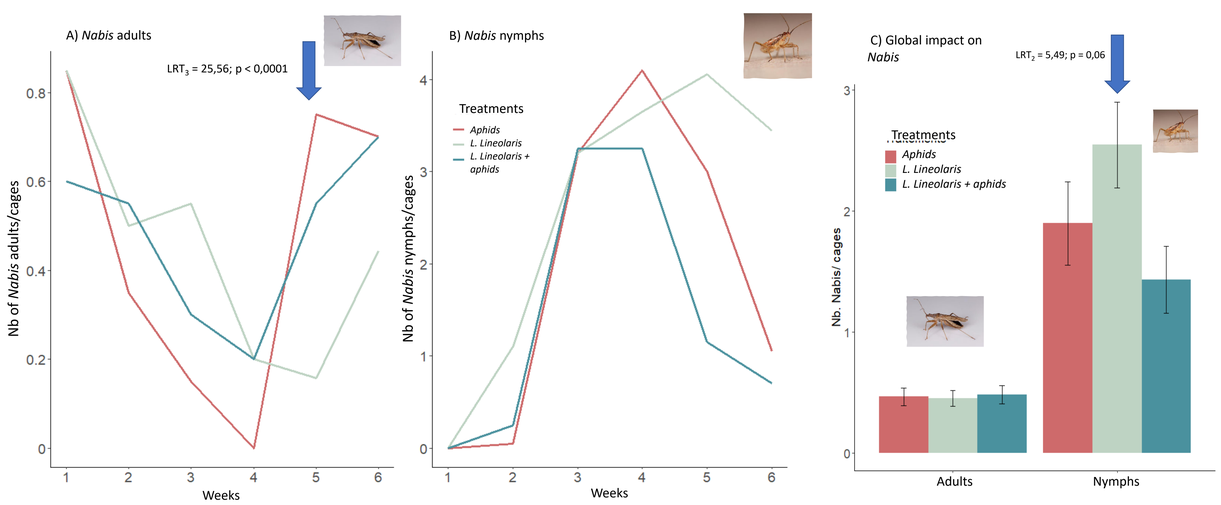


Figure 3. Impact of multiple preys on the population of the predator *Nabis.* A) On *Nabis* adults; B) On *Nabis* nymphs; C) Global impact of treatments on *Nabis* adults and nymphs

- It tooks 5 weeks to obtain a new generation of *Nabis*, which is very similar to the focus pest *L. lineolaris.*
- Peak of *Nabis* adults was 1 week earlier in presence of both preys
- Slightly more *Nabis* nymphs in presence of *L. lineolaris*
- No incidence of prey for *Nabis* adults

Discussion

- **Melon aphid is not a good prey for *Nabis americoferus*. Other experiments (Solà et al. 2022, 2019) demonstrated consumption of 48 *Myzus persicae* /day and significant reduction of population by *Nabis*. However, the presence of an aphid prey could benefit to *Nabis* and to its biocontrol on *L. lineolaris.***
- **Exponential increase of melon aphid impede negative impacts on *L. lineolaris* and *Nabis* populations, by competition for resources and the presence of honeydew.**
- **Biocontrol of *L. lineolaris* could be improvd by introducing *Nabis* before the arrival of *L. lineolaris***

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