Overwintering sites and natural enemies of the squash bugs in cucumber greenhouses in Quebec, Canada.

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Introduction

Squash bugs *Anasa tristis* and *A. armigera* (Heteroptera: Coreidae) are sporadic pests in Québec (Canada) cucumber greenhouses. These bugs can cause significant damage to cucumber, among other things, because it carries the bacterium *Serratia marcescens*, which causes cucurbit yellowing disease (1). The squash bug overwinters as an adult in hibernation sites near greenhouses (e.g. sheltered areas, crop residues, hedges) (2). Then, early in June, individuals migrate to the greenhouses to breed. A few natural enemies have been identified for the squash bug, the main one being the parasitoid *Trichopoda pennipes* (Diptera: Tachinidae) (3-4). No pesticides are registered against this pest in the greenhouse.

Objective: Gain knowledge of the biology of the squash bugs in greenhouse vegetable production that will allow the development and optimization of control methods.

Methods

Naturals enemies

Observations in three greenhouses per year have been done weekly between June and September 2019, 2020 and 2021. Specimens were captured and kept in the laboratory for parasitism evaluation and identification.

Overwintering sites

30 individuals were introduced into cages containing four types of substrates:

1) soil with rocks
2) soil with pieces of wood
3) soil with crop residues
4) soil.

Containers were kept outside for the winter period.

Individuals were removed and counted in the spring.

Results and discussion

Natural enemies

Table 1 : Natural enemies of the squash bug observed in greenhouses, 2021.

Site	*Forficula auricularia*	Spiders linyphiidae	Spiders lycosidae	*Coccinella septempunctata*	*Vibidia duodecimguttata*
Site 1-lib	33	9	7	1	3
Site 2-ang	0	4	20	0	0
Site 3-lib	1	11	39	0	0

Mainly spiders

- In 2019 and 2020, no parasitism was observed.
- In 2021, the parasitoid *T. pennipes* was collected from parasitized *A. armigera* individuals for 1 site. A parasitism rate of 61% was observed.

Eggs of *T. pennides*

Overwintering sites

In 2021 and 2022, *A. armigera* and *A. tristis* bugs were recovered in the substrate with crop residues

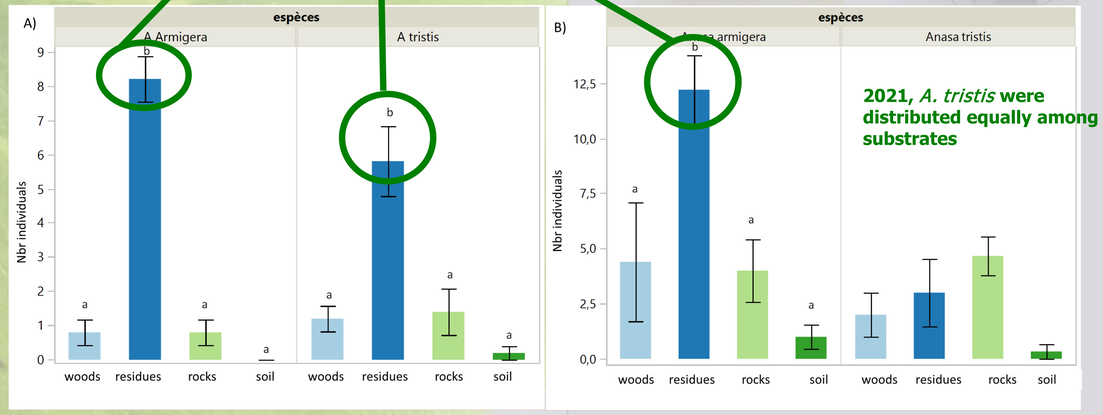

Figure 1 : Number of individuals found in the different overwintering substrates for the two species of squash bug, *A. armigera* and *A. tristis*. A) winter 2020-2021; B) winter 2021-2022.

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