A New Biocontrol Agent - Generalist Predatory Mite *Anystis baccarum*

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Introduction

Biological control has become the primary means of pest control in Canadian greenhouse crops. To support the continued growth, new biological control agents are needed to make the practice more robust and adaptive.

The predatory mite, *Anystis baccarum* has great potential:

- Globally distributed
- Voracious generalist predator of many pest species, including western flower thrips, foxglove aphids, spider mites, echinothrips, mealybugs and root aphids
- All females reproduce without mating
- Relatively large (2-3 mm, comparable to adult aphids and Orius, Fig. 1a)
- Although previously its high cannibalism rate was an obstacle to commercial production, we recently succeeded in developing cost-effective mass rearing methods

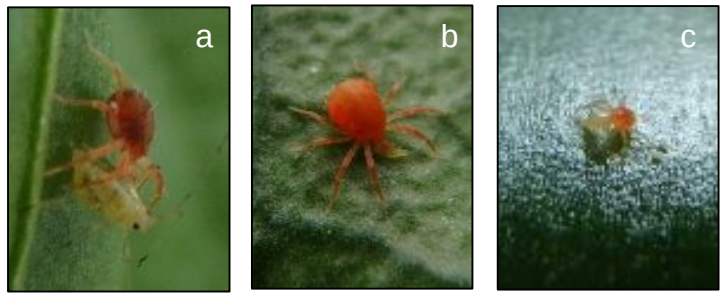

Figure 1. *Anystis baccarum* observed in greenhouse trials: (**a**) Adult mite consuming adult foxglove aphid, (**b**) Adult *mite* consuming a second instar western flower thrips, (**c**) Larval *mite* consuming a first instar western flower thrips

Efficacy against western flower thrips

In laboratory trials, *A. baccarum* outperformed both *Neoseiulus cucumeris* and *Amblyseius swirskii* against all larval and adult stages of western flower thrips (Table 1).

In greenhouse trials on chrysanthemums, combination treatment of *A. baccarum* with *N. cucumeris* sachets gave significantly better control of thrips compared to either predator alone (Fig. 2).

The same was observed against naturally occurring two-spotted spider mites.

Table 1. Mean number ± SE of western flower thrips died/eaten in 24 h (out of ten thrips) when confined with one adult predatory mite.
*Assays for 2nd instar thrips were done separately for *A. swirskii* and *N. cucumeris*.

Treatment	Adult female	2nd instar larvae*	2nd instar larvae*	1st instar larvae
Control	0.33 ± 0.11	0.29 ± 0.11	0.42 ± 0.12	0.71 ± 0.19
A. swirskii	0.17 ± 0.08	0.46 ± 0.16	N/A	N/A
N. cucumeris	0.29 ± 0.13	N/A	0.92 ± 0.18	4.08 ± 0.43
A. baccarum	5.29 ± 0.63	9.38 ± 0.31	8.52 ± 0.5	9.08 ± 0.39

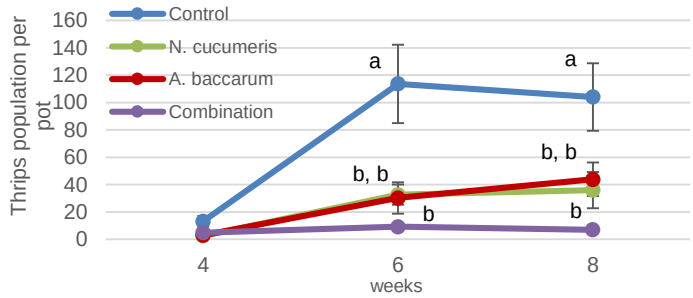

Figure 2. Mean ± SE number of western flower thrips on potted chrysanthemum with either *N. cucumeris* sachets, *A. baccarum* or a combination of the two. Different lowercase letters indicate significant differences per week.

Efficacy against foxglove aphids

In laboratory trials, *A. baccarum* consumed all foxglove aphid life stages with preference for the first instar nymphs (Fig. 3).

On greenhouse sweet peppers, combined releases of *Aphidius ervi* and *A. baccarum* gave better and faster control of foxglove aphids compared to *A. ervi* alone (Fig. 4). Combined releases also led to higher fruit yields.

The mite also fed on naturally occurring thrips during the trial (Fig. 1b,c) reducing thrips feeding damage on the fruits.

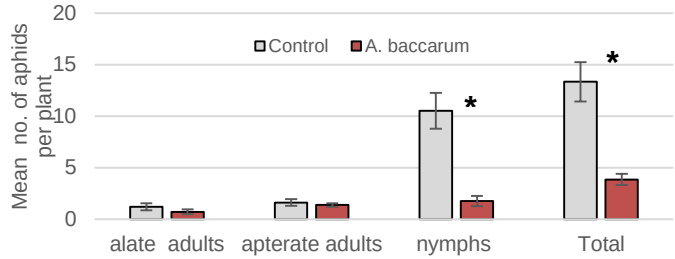

Figure 3. Mean ± SE number of foxglove aphids of different developmental stages on a pepper plant with and without *A. baccarum*, 72 h after five apterate adult aphids were released onto the plants. Asterisk indicates a significant difference between treatments.

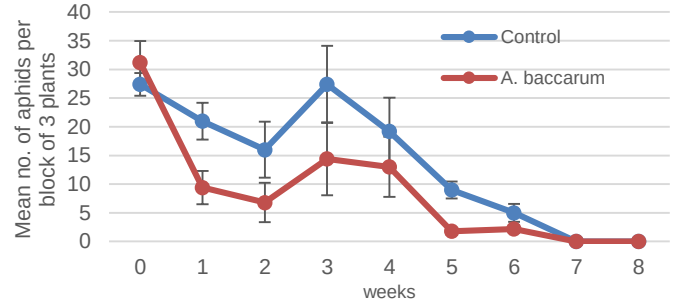

Figure 4. Mean ± SE number of foxglove aphids per block of three pepper plants. *Aphidius ervi* was released in both the control and *A. baccarum* treatments. Overall treatment effect was significantly different.

What's next?

- The new predator has been transferred to our partner, Applied Bio-nomics Inc., who are developing a production line.
- Future studies are planned to demonstrate the potential of *A. baccarum* in more crops, like cannabis and strawberry.

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References: Saito, T. and Brownbridge, M., 2017. *IOBC-WPRS Bull.* 124, 195-199; Saito, T. and Brownbridge, M., 2021. *Insects* 12,

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