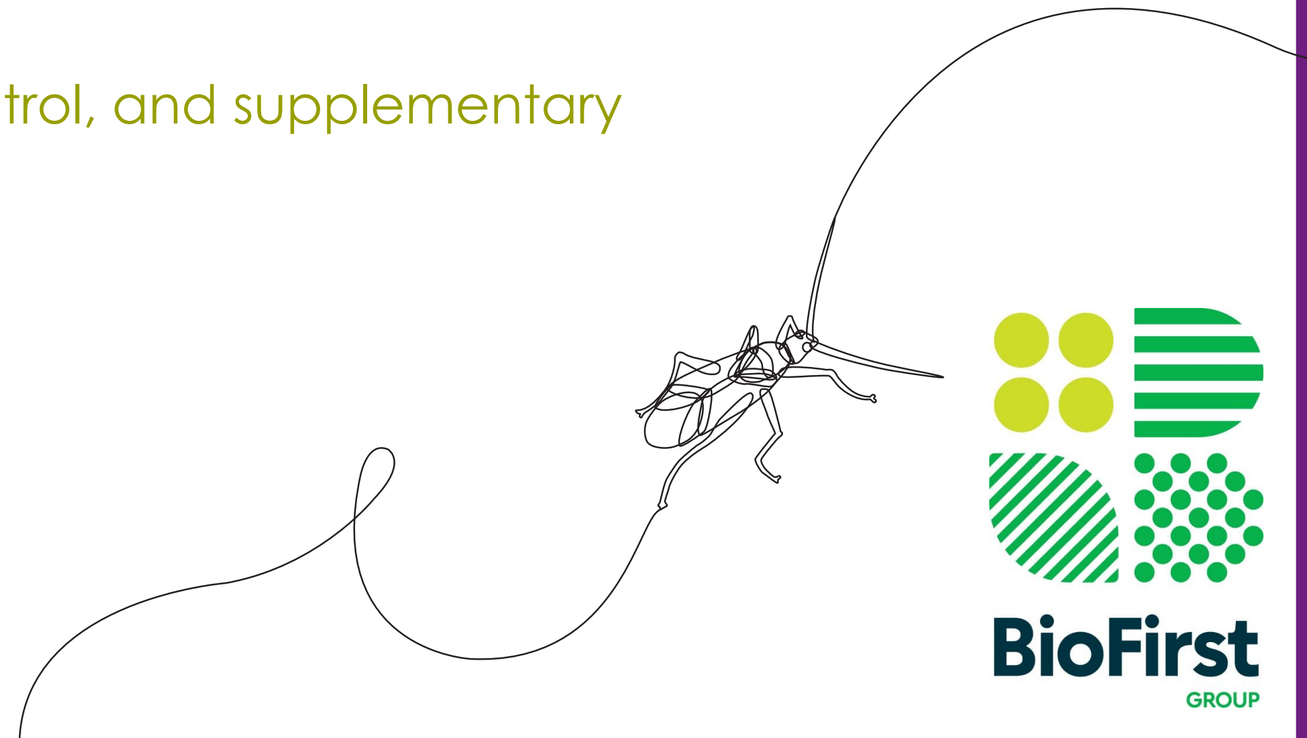
SUSTAINABLE CROP MANAGEMENT

www.biobestgroup.com

TIM CRITTENDEN

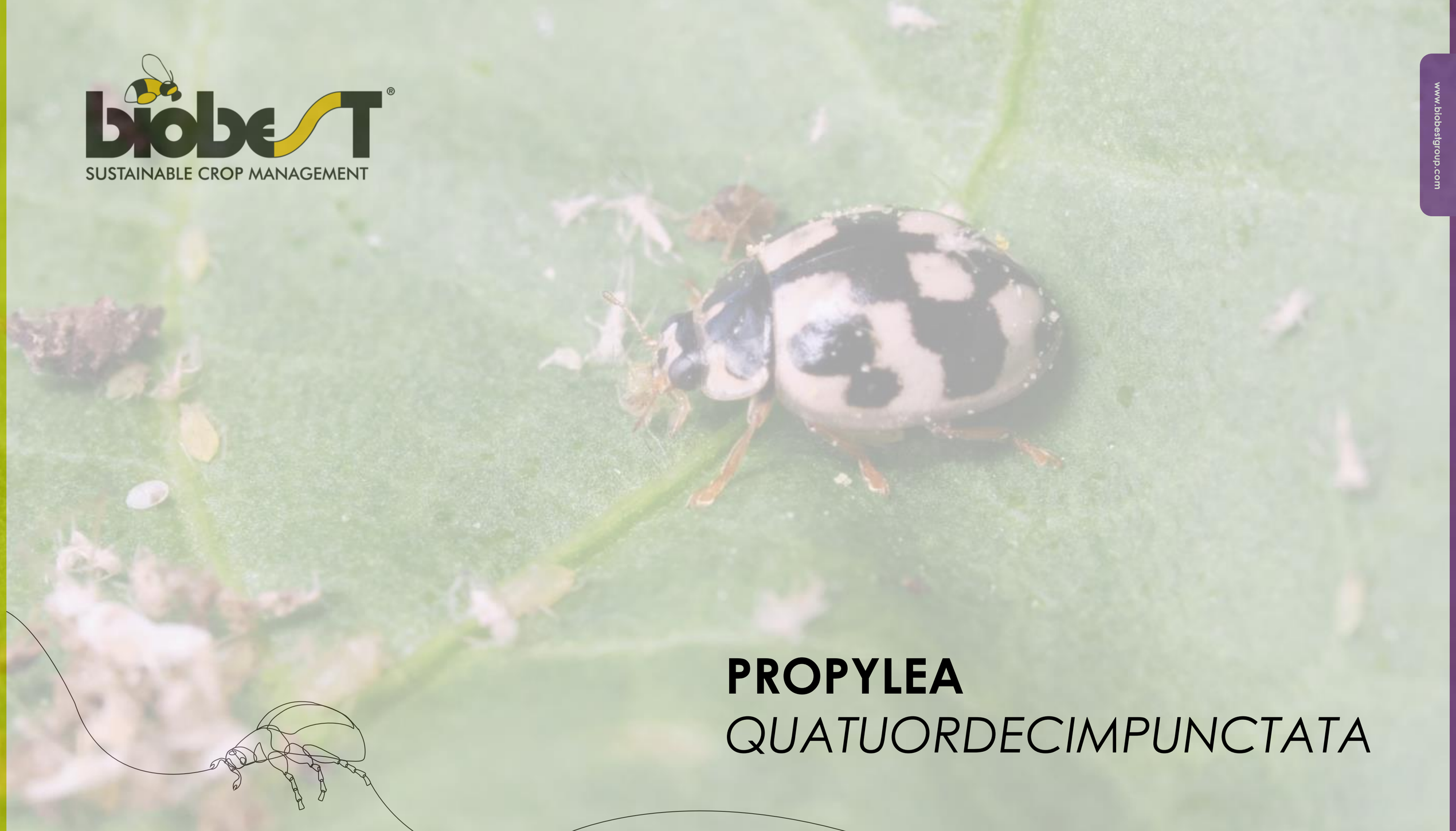
New macro-biological species for biocontrol, and supplementary feeding using ‘Nutrimite’



BioFirst GROUP

biobest®
SUSTAINABLE CROP MANAGEMENT

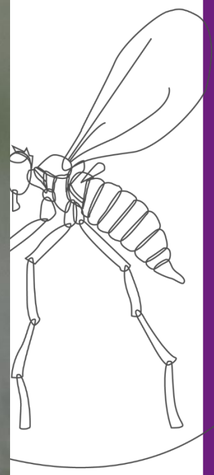
www.biobestgroup.com



PROPYLEA
QUATUORDECIMPUNCTATA

General Information

- *Propylea quatuordecimpunctata*
  14-spotted ladybird beetle.
- Found across Europe, Asia, and parts of North Africa.
- Optimal temp range is **20-28°C**.
  Development slows 15°C, stops near 10°C.
- Humidity: Prefers moderate humidity (**60-80%** RH).
  Too dry conditions can reduce survival.
- Light: Active in natural daylight; prefers longer photoperiods (**12+ hours of light**) for reproduction and activity.



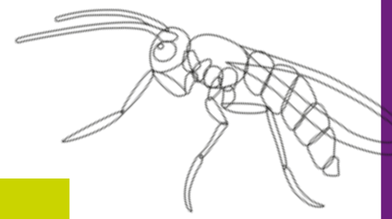
biobest SUSTAINABLE CROP MANAGEMENT

- Both larvae and adults are predators of many aphid species.
- After eating its own eggshell, the young larvae will immediately seek prey.
- *P. quatuordecimpunctata* will predate on all aphid stages.
- One larva or adult can eat up to 100 aphids/day.
- Females can lay more than 1,000 eggs, on average around 20 eggs/day.
- Females will start laying eggs as soon as aphids are found in the crop.
- Can also consume other pests, such as spider mites, caterpillar eggs and whiteflies.

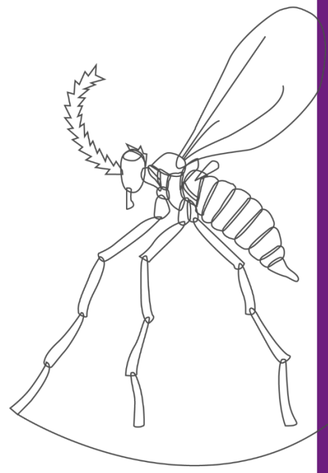
Practical Application and Dosage

Mode	Dosage (ind./m²)	Dosage (units/ha)	Area	Repeat
Preventative	0.025	1	Full field	4 times Weekly
Low curative	0.05	2	Hotspots and surroundings	4 times Weekly
High curative	0.1	4	Hotspots and surroundings	3 times Weekly

Role in Greenhouse Pest Control



Aphid Species	Preference Rating	Notes
Myzus persicae (Green peach aphid)	++	Generalist predator, but no specific high preference is noted.
Aphis fabae (Black bean aphid)	+	Less preferred compared to *Aphis gossypii*.
Rhopalosiphum padi (Bird cherry-oat aphid)	++	Common prey, but no specific strong preference mentioned.
Brevicoryne brassicae (Cabbage aphid)	++	Feeds on this species but not highlighted as a primary preference.
Macrosiphum euphorbiae (Potato aphid)	++	Likely consumed but no strong preference indicated.
Aulacorthum solani	++	Feeds on various aphids, including this one, without strong bias.



Propylea
quatuordecimpunctata

biobest
SUSTAINABLE CROP MANAGEMENT

SUSTAINABLE CROP MANAGEMENT

MICROMUS-SYSTEM: THE STORY SO FAR

MICROMUS ANGULATUS

Micromus angulatus

The brown lacewing

Neuroptera: Hemerobiidae

- Both larvae and adults are predacious.
- Larvae are active and prey upon aphids in temperatures as low as 10 °C.
- A single larva consumes on average 130 aphids before pupation.
- Adults can consume up to 100 aphids a day.
- Adults can live for up to 70 days and lay up to 1,000 eggs.

Prey sharing

9.6 lower development threshold

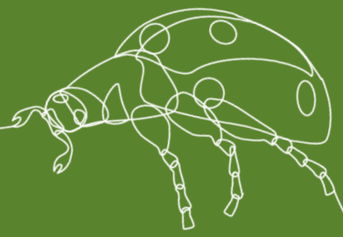
Lowlight levels

Nocturnal adults

biobest SUSTAINABLE CROP MANAGEMENT

INITIAL INFORMATION FROM THE FIELD

- PEPPERS
- STRAWBERRY
- CANNABIS
- BRIEFLY OTHERS



biobest SUSTAINABLE CROP MANAGEMENT

Micromus-System in Sweet Pepper

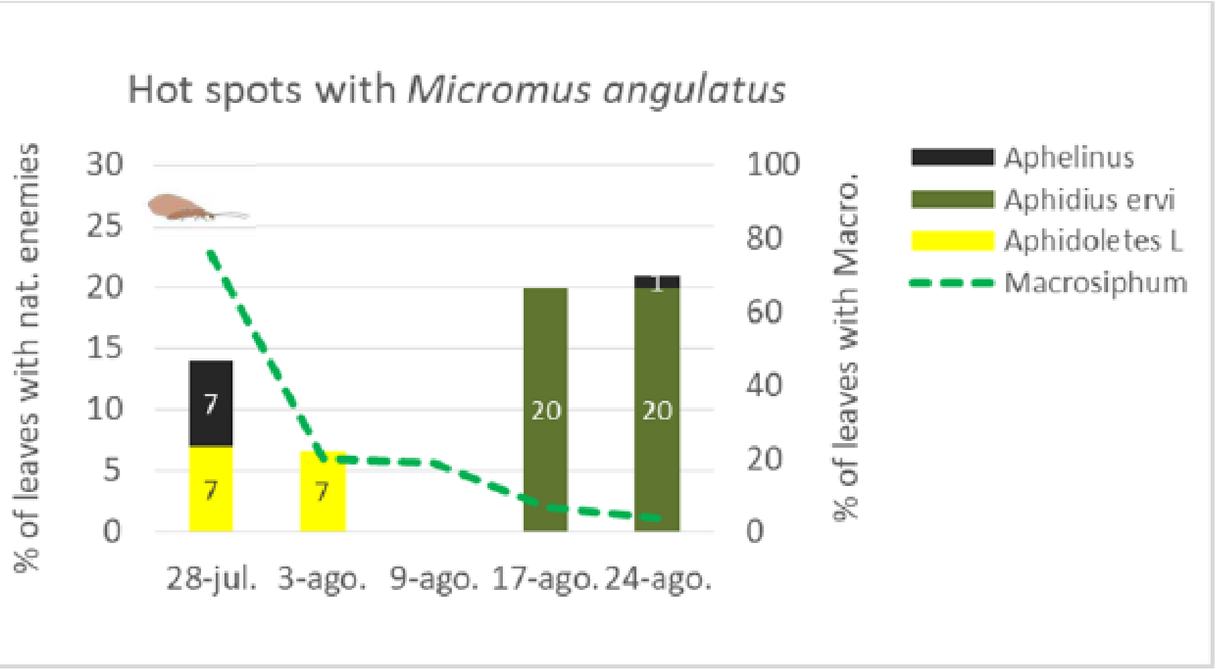
Conclusions so far:

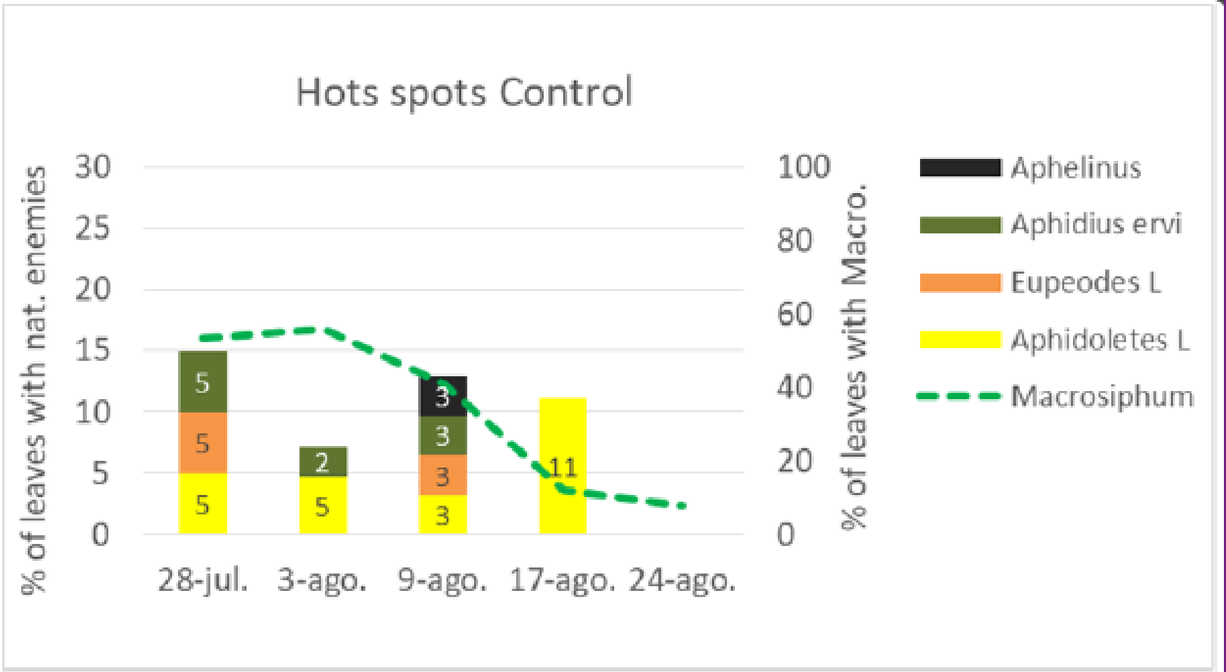
- Can quickly clean up aphid hot spots.
- Good control in combination with other aphid control products (*Aphidoletes*, *Aphidius* species, hoverflies).
- Also, active preventive approaches being used.

© Antonio Robledo

PRELIMINARY FIELD TRIAL DATA

Field trial: Predatory Effect of *Micromus* in Hot Spots





1 release: 50 i/plant

Antonio Robledo
David Abeijon Ivan Cano

- **Immediate action** is observed when releasing *Micromus* in *Macrosiphum* colonies.
- *Macrosiphum* populations **reduced faster** with introduction of *Micromus* compared to the control plants.

biobest SUSTAINABLE CROP MANAGEMENT

Micromus vs *Chrysoperla* Larvae – Morphological Differences

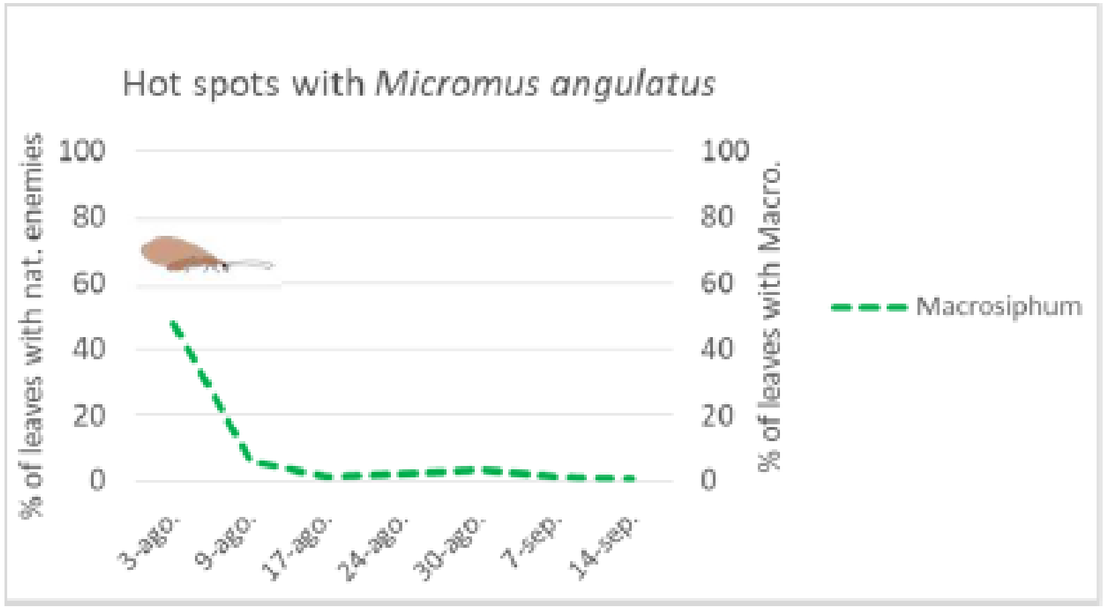
MICROMUS ANGULATUS

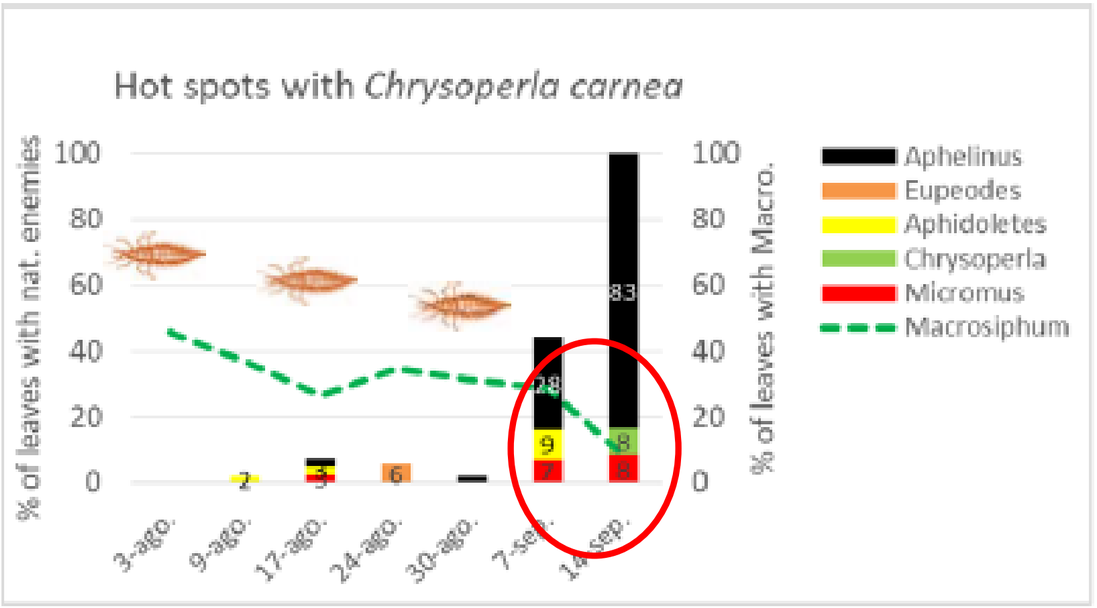
- First segment is oval shaped
- Less pronounced hairs
- Slender body

CHRYSOPERLA CARNEA

- First segment is rectangular shaped
- More pronounced hairs
- Thicker body

Field trial: Comparative Efficacy of *C. carnea* and *M. angulatus*





1 release: total 50 i/plant

3 releases: total 150 i/plant

Antonio Robledo
David Abeijon Ivan Cano

- 1 release of *Micromus* reduced *Macrosiphum* colonies **faster** than 3 releases of *Chryopserla*.

biobest SUSTAINABLE CROP MANAGEMENT

Micromus-System in Strawberry

Conclusions so far:

- *Micromus* feeds and completes its lifecycle on *Chaetosiphon and Macrosiphum*.
- Capable of cleaning out aphid hot spots.
- Good control in combination with other aphid control products *(Eupeodes)*.
- Varied feedback on ease of establishment.

Micromus observations in strawberry – commercial greenhouse Belgium

Micromus-System in Cannabis

Conclusions so far:

- *Micromus* feeds and completes its lifecycle on *Phorodon*.
- Varied feedback on ease of establishment.

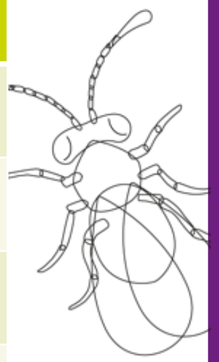
Micromus-System in Other Crops

- Blueberry (ESP): good control of *Ericaphis*.
- Ornamentals (BEL): similar performance to *Cryptolaemus* for control of mealybug.
- Lettuce (NLD&EST): good establishment and good control.

Compatibility in IPM Programmes

Micromus-System is compatible with and complementary to existing commercial solutions for aphid control

	Aphidius species	*Aphidoletes*	*Chrysoperla*	Hoverflies	*Micromus*
Aphids killed (max. potential)	300 parasitized	100 per larva	600 per larva	250-1000 per larva	**100/day (adult) 130 (larva)**
Predatory life stage	Adult	Larva	Larva	Larva	**Adult + Larva**
Eggs laid (maximum)	350	250	400	400-800	**1000**
Adult lifespan (days)	10-14	10-14	14	21	**70**
Temperature range (°C)	15-30	10-30	12-35	10-40	**10-30**
Optimum temperature (°C)	20-25	20-25	20-30	15-35	**15-26**
Searching range	Medium	Medium	Medium	Excellent	**Excellent**
Ease of establishment	Easy	Easy	Difficult	Easy	**Easy**
Sensitivity to (hyper)parasitism	High	Low	Low	Low	**Low**
Risk of intraguild predation	None	Medium-High	Low	Low	**Low**



Eupeodes corolla

Sphaerophoria rueppellii

SUSTAINABLE CROP MANAGEMENT

VESPIFORMIS-SYSTEM

A new addition to the thrips control portfolio

Vespiformis-System: A New Addition to the Thrips Control Portfolio

- **What?:**
- Predatory thrips adults in buckwheat shells.
- Primarily preys on pest thrips (various species and all mobile stages).

- **Why?:**
- Invasive pest thrips species.
- Predatory mites are limited to thrips larvae.
- *Orius* mainly in the flower.

- **Where?:**
- Mainly present on the leaf.
- Useful against leaf thrips (*Echinothrips*, Onion thrips).

- **How?:**
- Release directly onto the plant or in bioboxes.

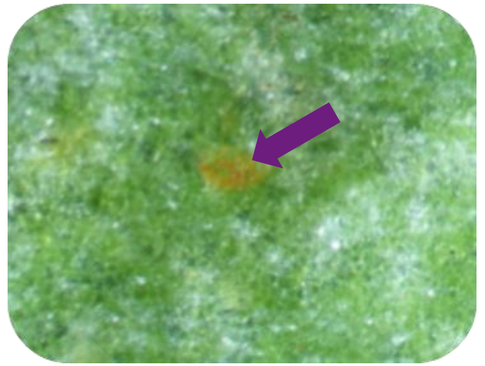
Life Cycle

Pupation (on the leaves): 7 days

Pre-oviposition period: 1 day

Franklinothrips vespiformis

Life cycle at 25 °C: 21 days



2nd instar → Prepupa: 2 days

Egg → 1st instar: 10 days

1st instar → 2nd instar: 2 days


Nutrimite™

What is Nutrimite?..

Nutrimite is a highly nutritional food supplement based on specially selected pollen to boost biocontrol.

- **Rich in nutrients and nutritionally balanced.**
- **Keeps its nutritional value for up to two weeks in the crop.**
- **Relatively resistant to mould and high humidity.**
- **Relatively unattractive to thrips.**
- **Not attractive to honeybees and bumblebees.**


NUTRIMITE™
500 g

Predatory Mite	Main Prey	Nutrimite™ Response
Amblyseius (Iphiseius) degenerans	Thrips, spider mites	++++
Amblyseius (Typhlodromips) swirskii	Thrips, whitefly	+++
Amblyseius andersoni	Spider mites	++
Amblyseius cucumeris	Thrips	+
Amblydromalus limonicus	Thrips, whitefly	+
Neoseiulus(Amblyseius) californicus	Spider mites	+/-
Transeius montdorensis	Thrips, whitefly	+++

Field Trial Waesland 2022

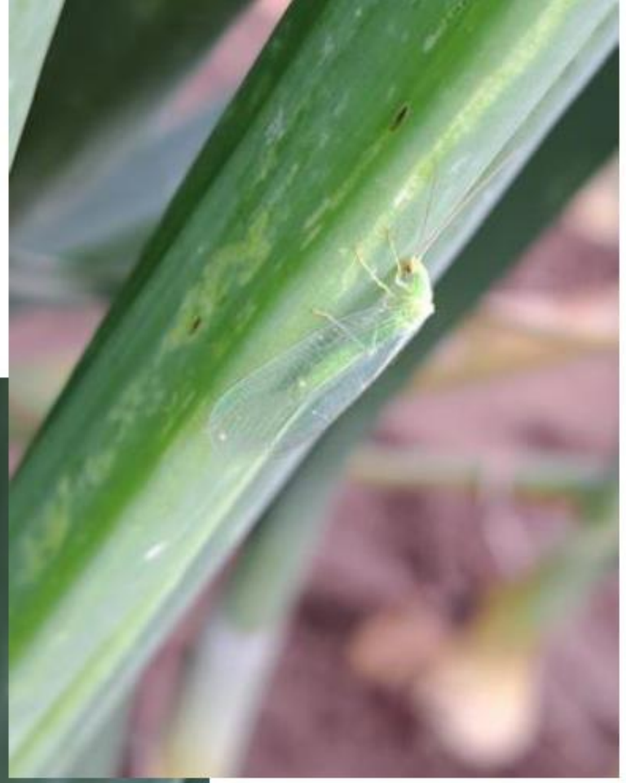
Felix Wäckers, R&D Biobestgroup

Onion Thrips (*Thrips tabaci*)

Field Trial Waesland 2022

Felix Wäckers, R&D Biobestgroup

Natural Enemies

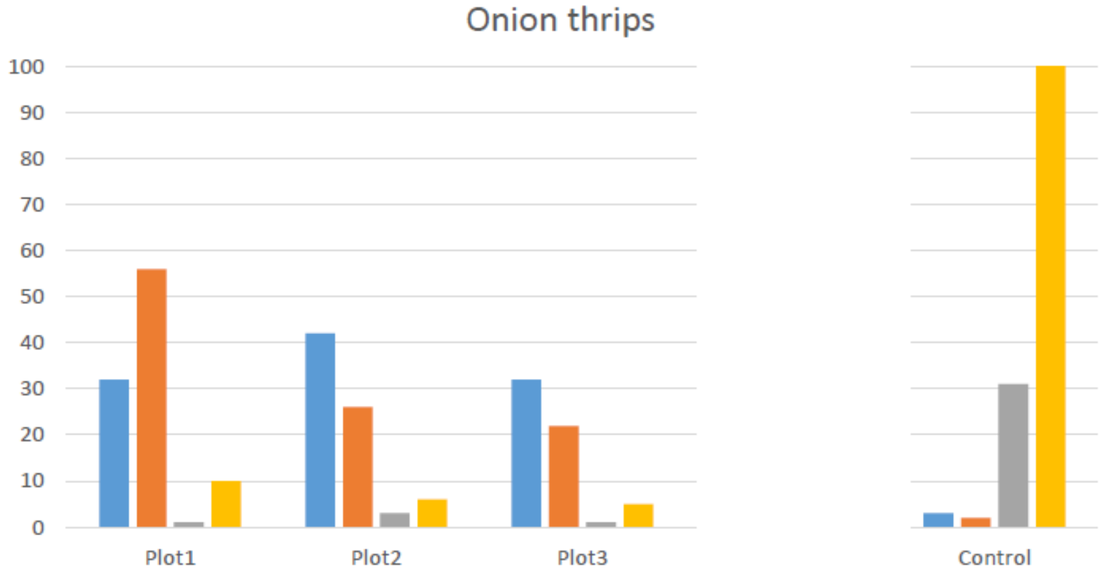


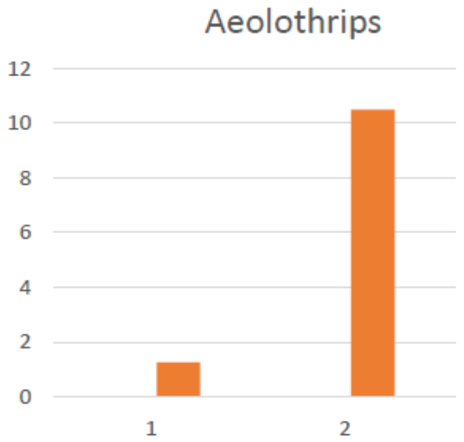
Aeolothrips intermedius

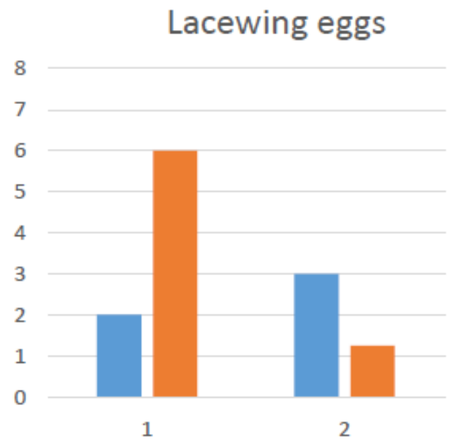
Field Trial Waesland 2022

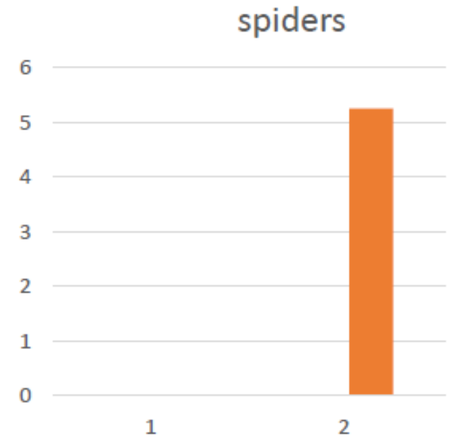
Felix Wäckers, R&D Biobestgroup

Counts per 10 plants









Field Trial Waesland 2022

Felix Wäckers, R&D Biobestgroup

Field Trial Waesland 2022

Felix Wäckers, R&D Biobestgroup

Diameter + 8%

Gewicht +15%

Thank You

BioFirst GROUP

BIOBEST