New developments in biological pest control

Agrii, Throws Farm, Dunmow CM6 3AQ

6th May 2025

Contents

Agenda

Time	Content	Speaker
Agrii, Throws Farm, Leatheart conference room		
09:00 – 09:30	*Coffee, tea, and refreshments*	
Presentations		
09:30 – 10:10	**New macro-biological species for biocontrol, and supplementary feeding using 'Nutrimite'**	Tim Crittenden, **Biobest UK**
10:10 – 10:50	**New methods for the efficient introduction of biocontrol agents**	Caroline Reid, **Bioline Agrosciences**
10:50 – 11:00	*Coffee, tea, and refreshments*	
11:00 – 11:40	**Natutec Airobreez – new hand-held release system**	Stella Cubison, **Koppert UK**
11:40 – 12:20	**TruePest, an AI driven Smart Monitoring Ecosystem for thrips and whitefly, and 'Push-Pull' IPM techniques for the control of thrips**	Andrew Russell, **Russell IPM Group**
12:20 – 13:00	**Where next with biological pest control?**	Selchuk Kurtev, **Zest Sustainable ICM**
13:00 – 13:45	*Lunch buffet*	
Exhibition / demonstrations in the trial glasshouse		
14:00 – 14:15	Introduction to Agrii and the site facilities	Matt Greep and team, **Agrii**
14:15 – 16:00	Demonstrations by the biocontrol suppliers – delegates split into two groups: • **Biobest stand** – Trap Eye, PATS-C Demonstration 20 mins • **Bioline Agrosciences stand** – SPRAYVENT Demonstration 20 mins • **Koppert stand** – Natutec Airobreez Demonstration 20 mins • **Russell IPM stand** – TruePest Demonstration 20 mins	**Biocontrol suppliers**
16.30	*Wrap up, networking and depart*	

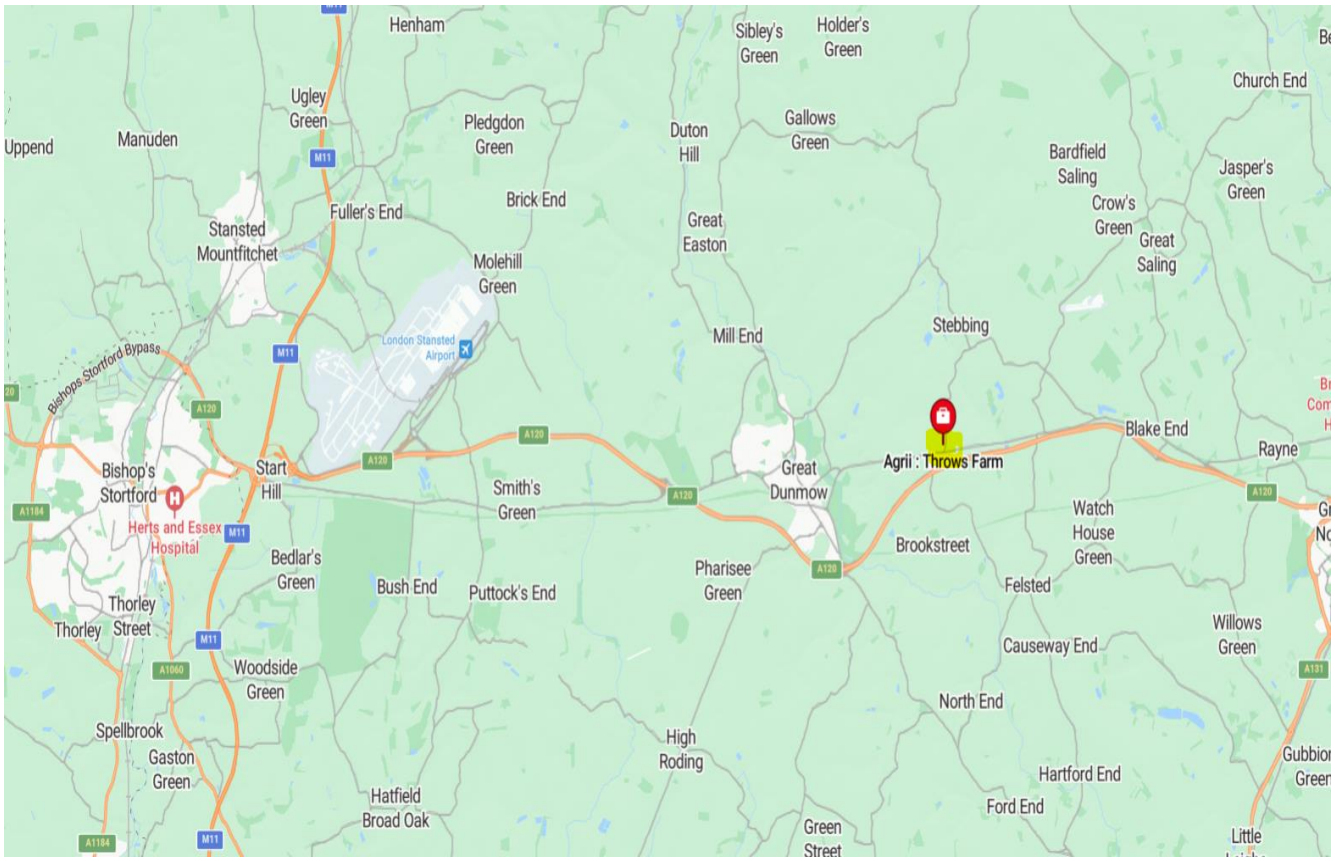
BASIS and NRoSO continued professional development points will be available on the day of the workshop.

Location

Addresses and locations:

Agrii, Throws Farm, Dunmow CM6 3AQ (highlighted in yellow on the map)

What3words: ///unclaimed.shrubbery.fondest



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

Tim Crittenden, Biobest UK

Notes

- 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.

4

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.

6

Notes

Notes

Propylea
quatuordecimpunctata

biobest
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
Noctumal adults

INITIAL INFORMATION FROM THE FIELD

- PEPPERS
- STRAWBERRY
- CANNABIS
- BRIEFLY OTHERS

10

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.

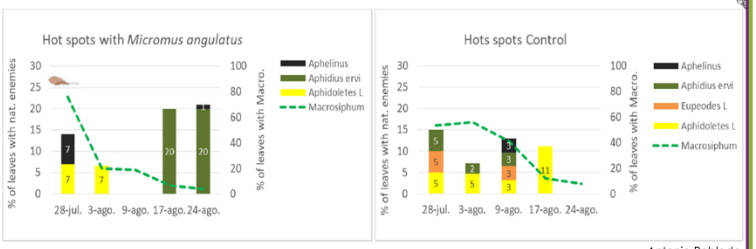
11

PRELIMINARY FIELD TRIAL DATA

12

Notes

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.

13

©Pictures and videos provided by Ward Stepman and Antonio Robledo

Micromus vs *Chrysoperla* Larvae – Morphological Differences

MICROMUS ANGULATUS

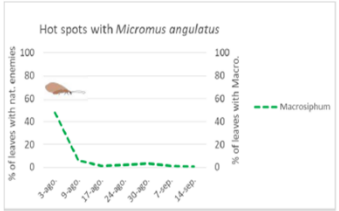
- First segment is oval shaped
- Less pronounced hairs
- Slender body

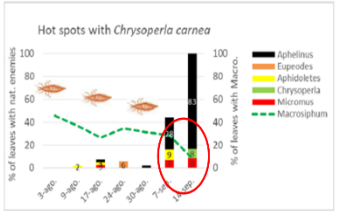
CHRYSOPERLA CARNEA

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

14

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*.

15

Notes

Micromus-System in Strawberry

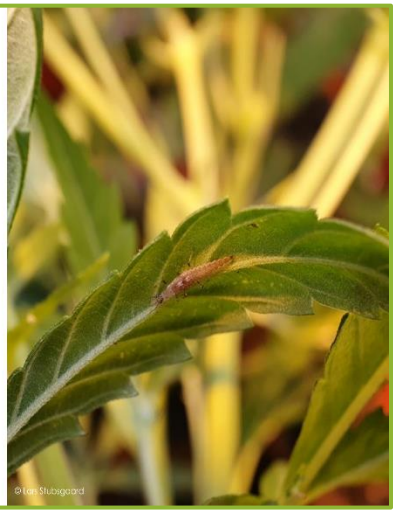
Conclusions so far:

- *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.

16

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.

18

Notes

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.

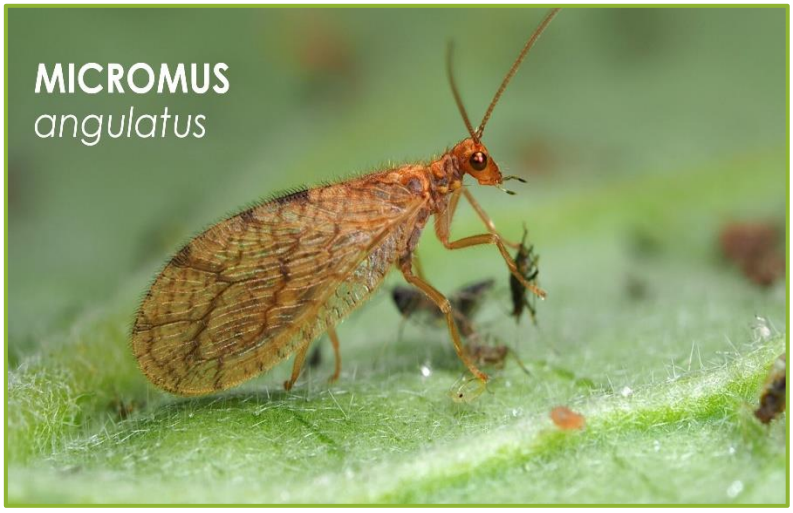
19

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

20



Notes

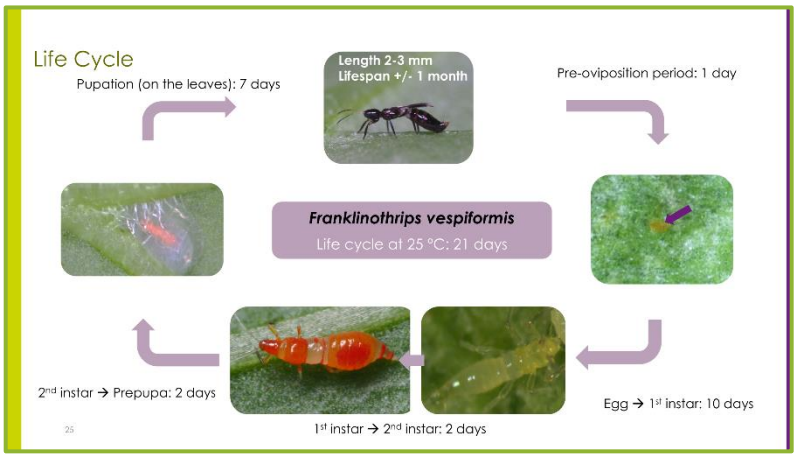
Notes


Eupeodes corolla
Sphaerophoria rueppellii
22


biobest
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.
24
biobest

Notes


Life Cycle
Pupation (on the leaves): 7 days
Length 2-3 mm
Lifespan +/- 1 month
Pre-oviposition period: 1 day
Franklinothrips vespiformis
Life cycle at 25 °C: 21 days
2nd instar → Prepupa: 2 days
1st instar → 2nd instar: 2 days
Egg → 1st instar: 10 days
25


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.**

28

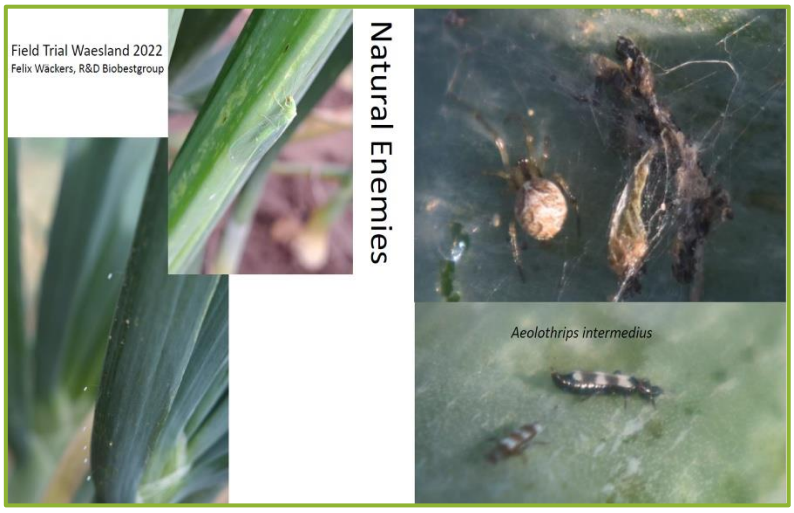
29

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	+++

30

Notes


Field Trial Waesland 2022
Felix Wäckers, R&D Biobestgroup
Onion Thrips (*Thrips tabaci*)

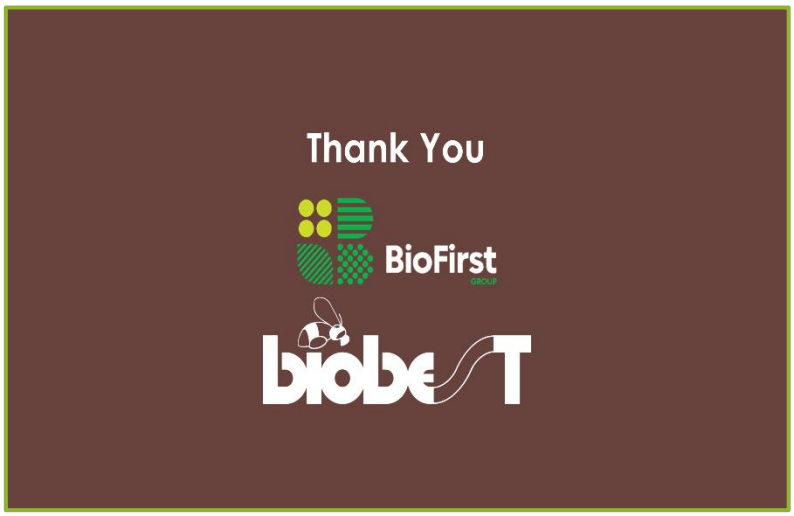

Field Trial Waesland 2022
Felix Wäckers, R&D Biobestgroup
Natural Enemies
Aeolothrips intermedius


Field Trial Waesland 2022
Felix Wäckers, R&D Biobestgroup
Counts per 10 plants
Onion thrips
Plot1
Plot2
Plot3
Control
Aeolothrips
Lacewing eggs
spiders

Notes


Field Trial Waesland 2022
Felix Wäckers, R&D Biobestgroup

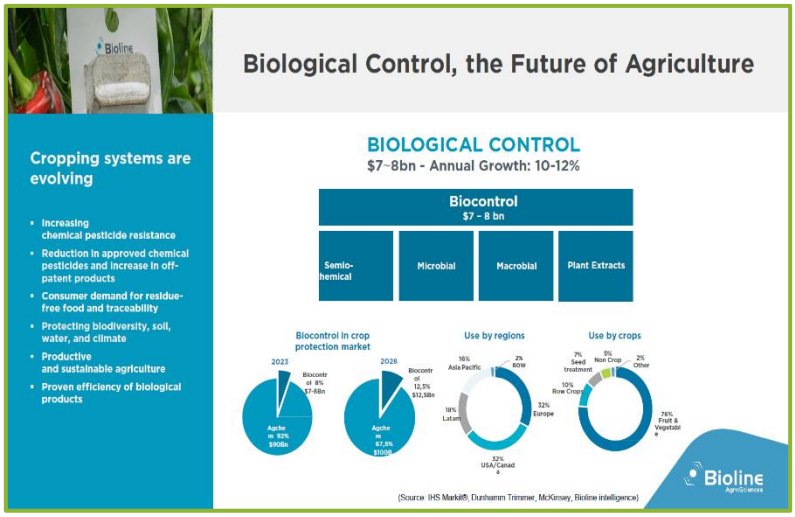

Field Trial Waesland 2022
Felix Wäckers, R&D Biobestgroup
Diameter + 8%
Gewicht +15%

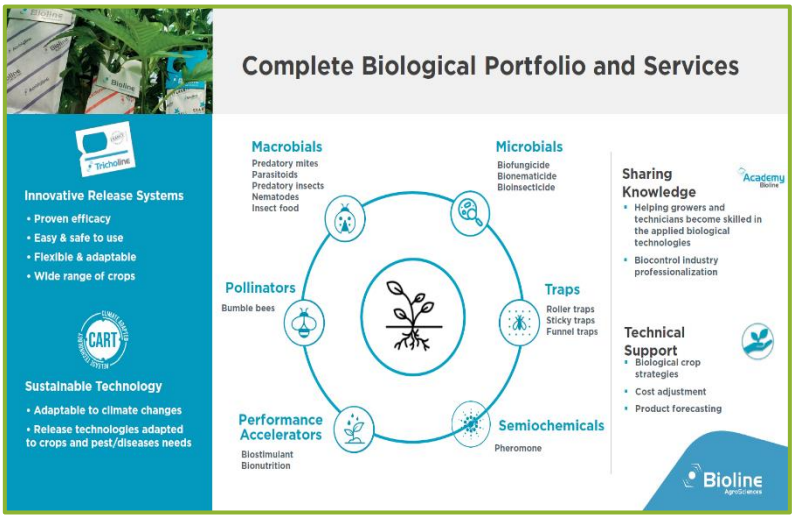

Thank You
BioFirst
GROUP
biobest

Notes

New methods for the efficient introduction of biocontrol agents

Dr Caroline Reid, Bioline Agrosciences

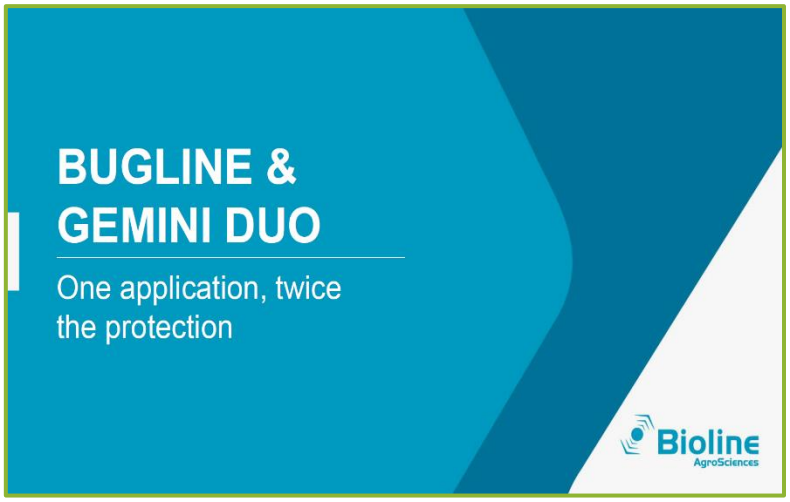


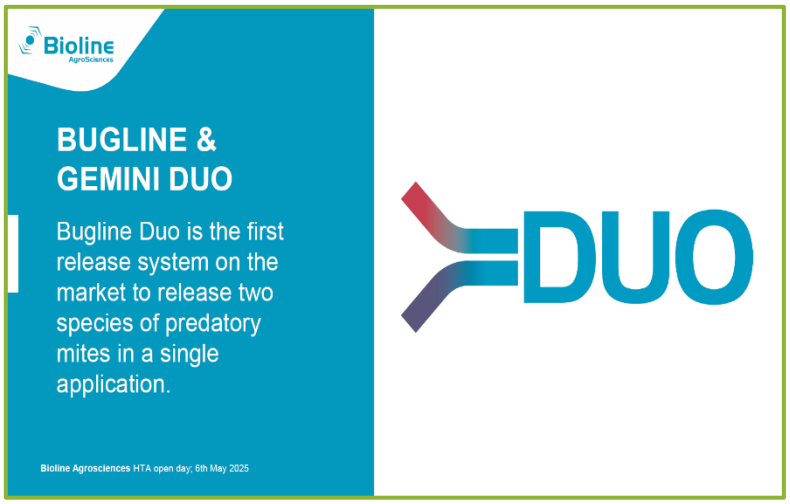


Notes

Notes


Our Flagship Products
Patented
Trade Secret
Climate Adapted Release Technology
IBMA Bernard Blum Award
SIVAL Award
Product Group
Product Brand
Formulation
Release System
Sustainable Technology
Predatory Mites
Phytoline
Californiline
Anderline
Starskil
Amblyline
+ 50 formulatio
Control Release
Bugline
Gemini
Duo
Sachet/stick
Fast Release
Blister
Starskil
Parasitoid Insect
Tricholine
+ 8 formulati
T-Vitis
Openfield Release
T-protect / T-booster
Capsule
Dispenser
Insect Food
PREDAFIX +
Bioline AgroSciences


BUGLINE & GEMINI DUO
One application, twice the protection
Bioline AgroSciences


Bioline AgroSciences
BUGLINE & GEMINI DUO
Bugline Duo is the first release system on the market to release two species of predatory mites in a single application.
DUO
Bioline Agrosciences HTA open day; 6th May 2025

DISCOVERING BUGLINE & GEMINI DUO

01

✓BUGLINE & GEMINI DUO: the exclusive combination of two predatory mites in the same product

- The innovative BUGLINE & GEMINI DUO contains two different species of predatory mites with complementary actions. This exclusive combination in the same release system is designed to protect crops from several pests with a single application..

BUGLINE & GEMINI DUO at a glance

One application, twice the protection

Bioline Agrosciences HTA open day; 6th May 2025

Bioline AgroSciences

✓CRS sachets: long-lasting effectiveness

- The sachets that make up BUGLINE & GEMINI DUO feature the CRS technology. Thanks to this technology, each sachet constitutes a mini-breeding system of predatory mites. They gradually emerge from the sachet over a period of several weeks, ensuring continuous crop protection.

BUGLINE & GEMINI DUO at a glance

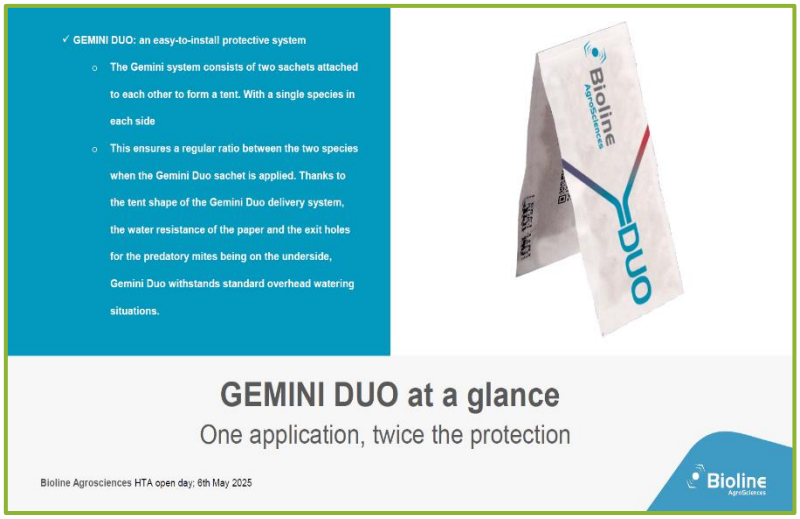
One application, twice the protection

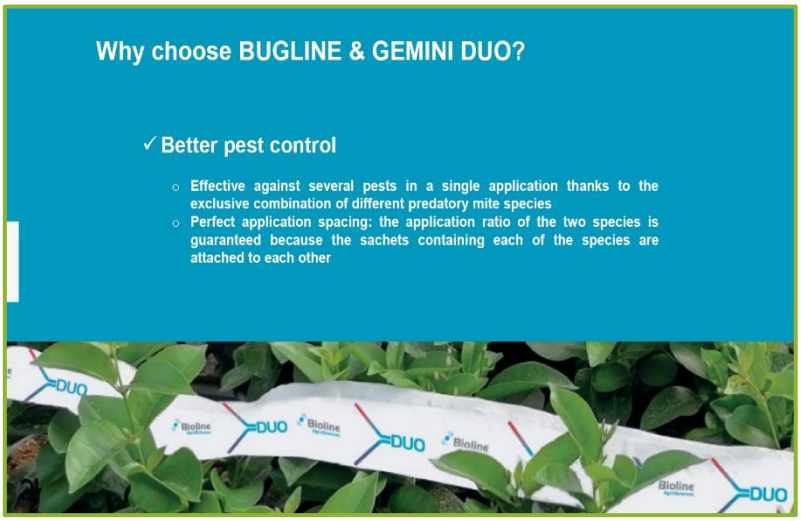
Bioline Agrosciences HTA open day; 6th May 2025

Bioline AgroSciences

Notes


✓ BUGLINE DUO: a self-dosing strip for easy application
The Bugline system consists of sachets attached to each other to form a strip. The predatory mites species are distributed in the sachets at a constant dose and in totally regular spacing assuring a uniform dose without having to worry about the distribution of the products.
The paper used to make Bugline Duo is waterproof, and the exit holes for predatory mites are on the underside, Bugline Duo can withstand standard overhead spraying situations.
BUGLINE DUO at a glance
One application, twice the protection
Bioline Agrosciences HTA open day; 6th May 2025
Bioline


✓ GEMINI DUO: an easy-to-install protective system
The Gemini system consists of two sachets attached to each other to form a tent. With a single species in each side
This ensures a regular ratio between the two species when the Gemini Duo sachet is applied. Thanks to the tent shape of the Gemini Duo delivery system, the water resistance of the paper and the exit holes for the predatory mites being on the underside, Gemini Duo withstands standard overhead watering situations.
GEMINI DUO at a glance
One application, twice the protection
Bioline Agrosciences HTA open day; 6th May 2025
Bioline


Why choose BUGLINE & GEMINI DUO?
✓ Better pest control
Effective against several pests in a single application thanks to the exclusive combination of different predatory mite species
Perfect application spacing: the application ratio of the two species is guaranteed because the sachets containing each of the species are attached to each other

Notes

Why choose BUGLINE & GEMINI DUO?

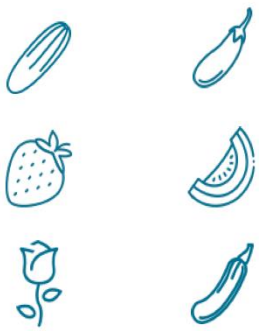
✓ **Easier and faster application**

- BUGLINE DUO:
  - Simply unroll the strip in the crop for upto 50% reduction in application time
  - Automatable system: the strip can be attached to the boom of a spraying system integrated into the greenhouse to mechanise unrolling and save even more time during application
- GEMINI DUO: simply attach the Gemini Duo delivery system to the crop to reduce application time

Why choose BUGLINE & GEMINI DUO?

✓ **Safer product**

- No dosage errors: the BUGLINE DUO strip ensures uniform distribution, even without expert application of beneficials
- Perfect uniformity of application: the spaces between the sachets are identical
- No residues on the crop
- No loss of product through sliding between the leaves
- Quick and easy removal of the strip at the end of the efficacy period



BUGLINE & GEMINI DUO: Target crops and uses

BUGLINE & GEMINI DUO can be used on multiple crops such as:

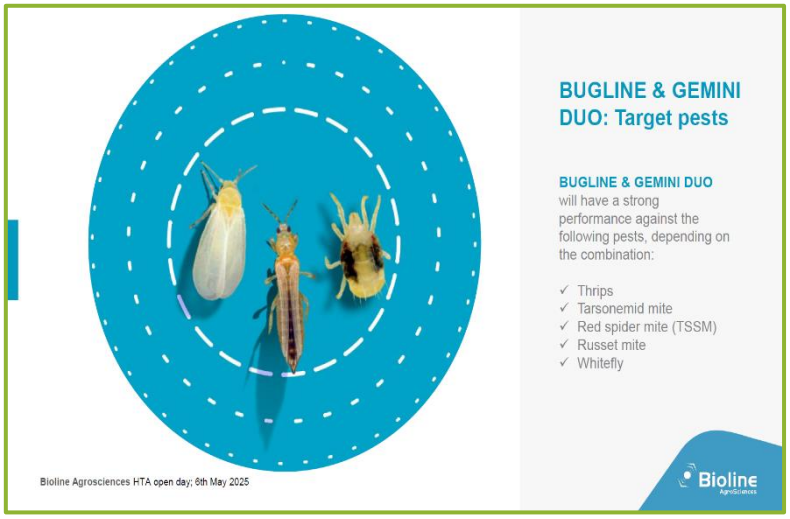
- ✓ Cucumbers
- ✓ Strawberries
- ✓ Ornamentals
- ✓ Aubergines
- ✓ Melon Watermelon
- ✓ Courgettes
- ✓ Herbs
- ✓ Cannabis
- ✓ And others…

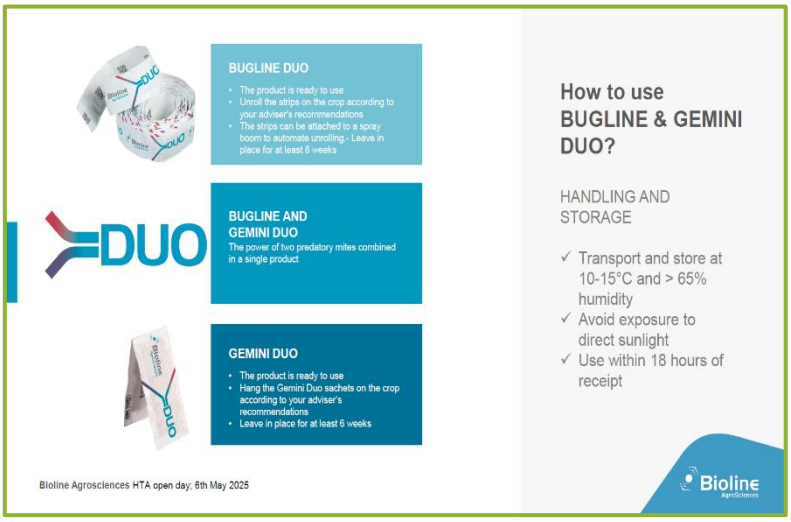
Bioline Agrosciences HTA open day: 6th May 2025

Bioline AgroSciences

Notes


BUGLINE & GEMINI DUO Packaging available
BUGLINE AND GEMINI DUO are available as different combinations of mites.
As your distributor for information on available products
Amblyline
Anderline
Californiline
STARSKii
Bioline Agrosciences HTA open day; 6th May 2025
BUGLINE DUO
SWICAL
- Swirskii 250 mites per sachet (1 sachet per meter / 250 mites per meter)
- Californicus 125 mites per sachet (1 sachet per meter / 125 mites per meter)
- Sachet alternance: A/O/O/O/O/B/O/C/O/O
CUCAND
- Cucumeris 500 mites per sachet (1 sachet per meter / 500 mites per meter)
- Andersoni 125 mites per sachet (1 sachet per meter / 125 mites per meter)
- Sachet alternance: A/O/O/O/O/B/O/O/O/O
GEMINI DUO
SWICAL
- Swirskii 125 mites per sachet
- Californicus 125 mites per sachet
CUCAND
- Cucumeris 500 mites per sachet
- Andersoni 125 mites per sachet

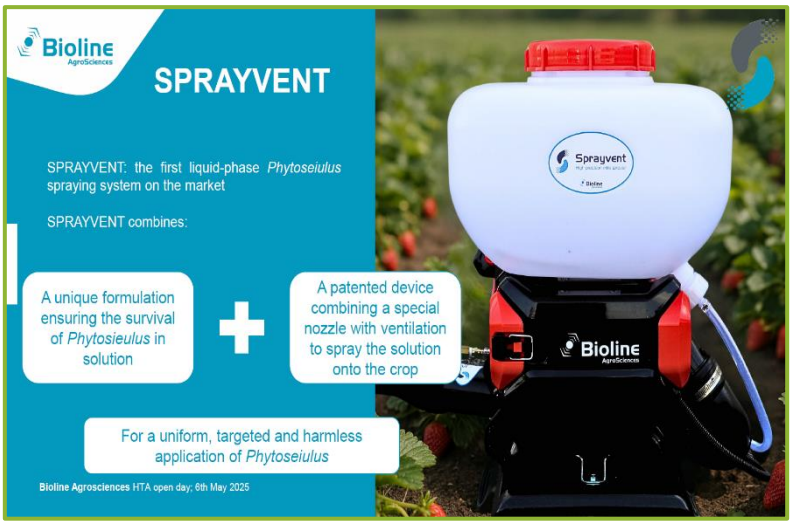

BUGLINE & GEMINI DUO: Target pests
BUGLINE & GEMINI DUO will have a strong performance against the following pests, depending on the combination:
✓ Thrips
✓ Tarsonemid mite
✓ Red spider mite (TSSM)
✓ Russet mite
✓ Whitefly
Bioline Agrosciences HTA open day; 6th May 2025
Bioline


BUGLINE DUO
• The product is ready to use
• Unroll the strips on the crop according to your adviser's recommendations
• The strips can be attached to a spray boom to automate unrolling.- Leave in place for at least 6 weeks
DUO
BUGLINE AND GEMINI DUO
The power of two predatory mites combined in a single product
GEMINI DUO
• The product is ready to use
• Hang the Gemini Duo sachets on the crop according to your adviser's recommendations
• Leave in place for at least 6 weeks
How to use BUGLINE & GEMINI DUO?
HANDLING AND STORAGE
✓ Transport and store at 10-15°C and > 65% humidity
✓ Avoid exposure to direct sunlight
✓ Use within 18 hours of receipt
Bioline Agrosciences HTA open day; 6th May 2025
Bioline

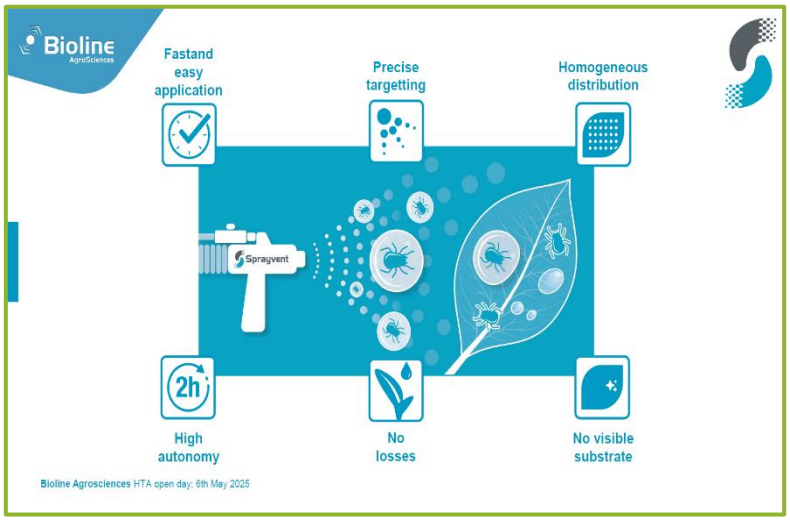
Notes


Sprayvent
High precision mite sprayer
Bioline
AgroSciences

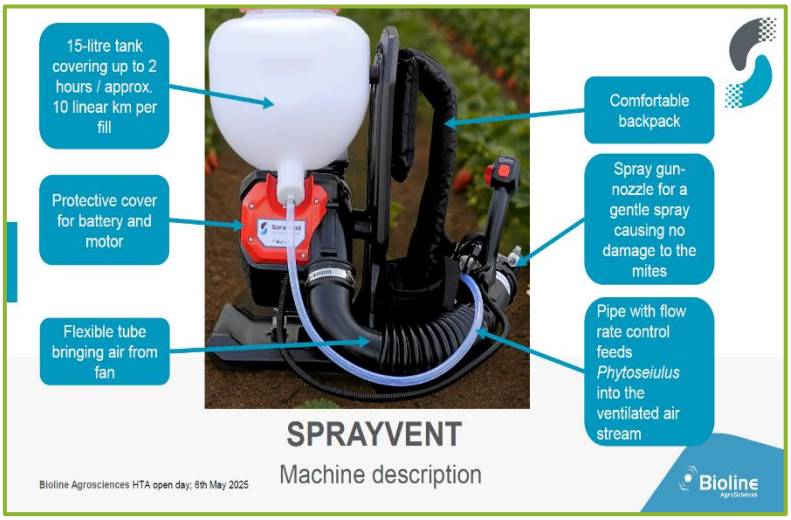

Bioline
AgroSciences
SPRAYVENT
A patented sprayer for the application of *Phytoseiulus* in liquid form.
Ensures uniform distribution, reduces losses, and improves efficiency.
SPRAYVENT making biological pest control easier, faster, and more effective.
Bioline Agrosciences HTA open day; 6th May 2025
Sprayvent
Bioline


Bioline
AgroSciences
SPRAYVENT
SPRAYVENT: the first liquid-phase *Phytoseiulus* spraying system on the market
SPRAYVENT combines:
A unique formulation ensuring the survival of *Phytoseiulus* in solution
+
A patented device combining a special nozzle with ventilation to spray the solution onto the crop
For a uniform, targeted and harmless application of *Phytoseiulus*
Bioline Agrosciences HTA open day; 6th May 2025
Sprayvent
Bioline

Notes

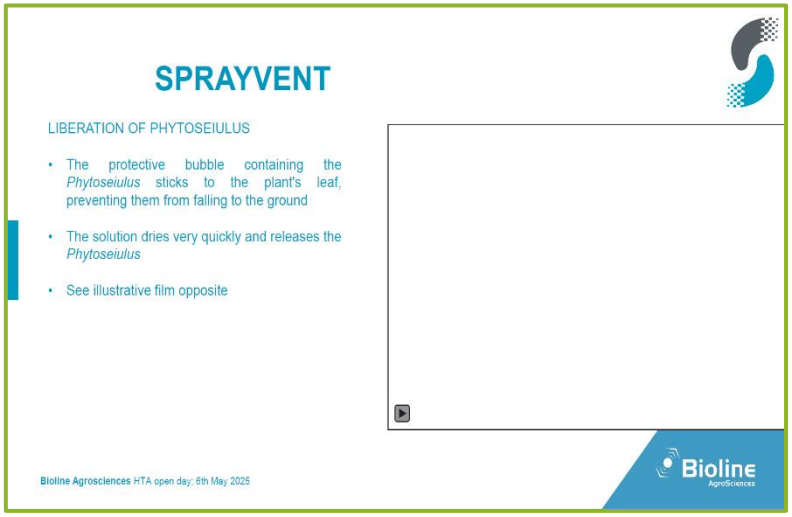

Bioline AgroSciences
Fastand easy application
Precise targetting
Homogeneous distribution
Sprayvent
2h
High autonomy
No losses
No visible substrate
Bioline Agrosciences HTA open day; 6th May 2025


Sprayvent
How it works


15-litre tank covering up to 2 hours / approx. 10 linear km per fill
Protective cover for battery and motor
Flexible tube bringing air from fan
Comfortable backpack
Spray gun-nozzle for a gentle spray causing no damage to the mites
Pipe with flow rate control feeds Phytoseiulus into the ventilated air stream
SPRAYVENT
Machine description
Bioline Agrosciences HTA open day; 6th May 2025
Bioline AgroSciences

Notes

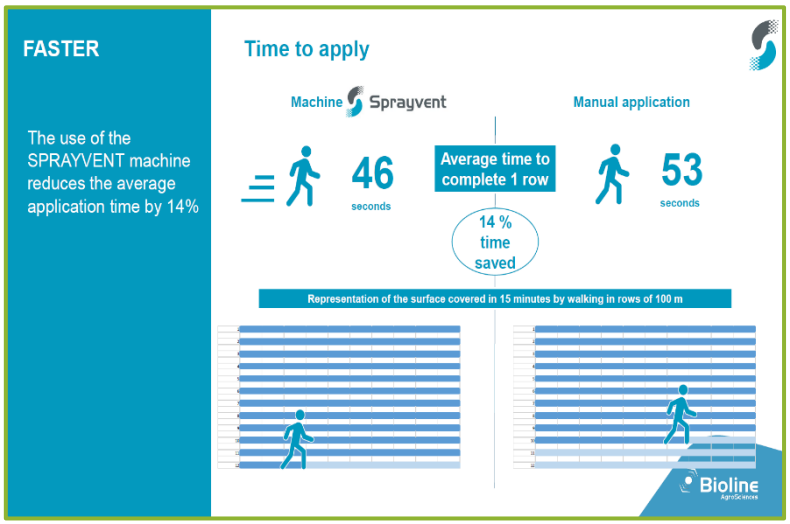

Bioline AgroSciences
SPRAYVENT
HOW IT WORKS
• Phytoseiulus pre-mixed in solution with the adjuvant, is placed in the tank
• A fan creates a power-controlled airflow, channeled into the flexible duct
• The Phytoseiulus solution flows under gravity through the intake pipe
• The flow of Phytoseiulus is regulated by a dosing valve
• The aqueous solution and the ventilated air mix in the nozzle
• The nozzle creates fine droplets of solution containing Phytoseiulus, which are carried by the airflow to the plants
Bioline Agrosciences HTA open day; 6th May 2025

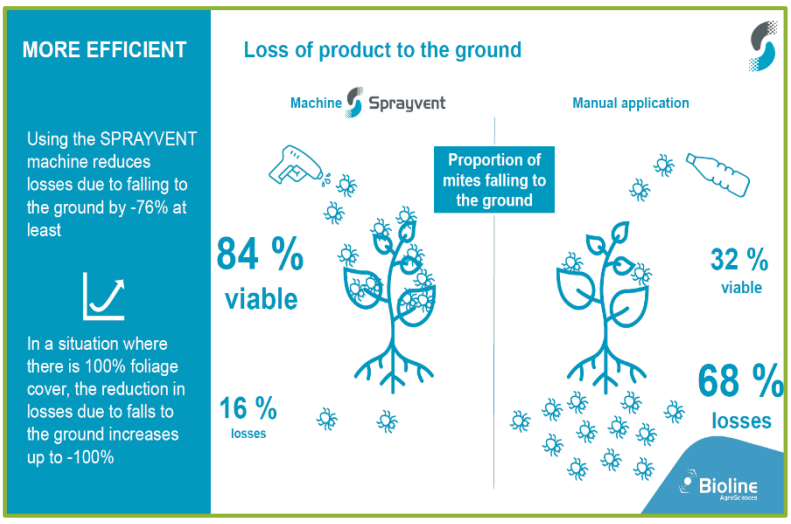

SPRAYVENT
LIBERATION OF PHYTOSEIULUS
• The protective bubble containing the Phytoseiulus sticks to the plant's leaf, preventing them from falling to the ground
• The solution dries very quickly and releases the Phytoseiulus
• See illustrative film opposite
Bioline Agrosciences HTA open day; 6th May 2025
Bioline AgroSciences


Sprayvent
Product benefits

Notes


✓The first, patented, liquid phase spraying for Phytoseiulus
✓No losses: Phytoseiulus do not fall to the ground
✓Homogeneous distribution of Phytoseiulus on plants improves efficiency
✓Precise targeting of specific areas of the plant
✓Fast application: saves time on application
✓Easy application: no variability due to the operator
✓No visible substrate or residue on the crop
✓Very low water volume
✓Reduction of packaging waste
SPRAYVENT
The high-precision predatory mite sprayer
Bioline Agrosciences HTA open day; 6th May 2025
Bioline


FASTER
The use of the SPRAYVENT machine reduces the average application time by 14%
Time to apply
Machine Sprayvent
Manual application
46
seconds
Average time to complete 1 row
53
seconds
14 % time saved
Representation of the surface covered in 15 minutes by walking in rows of 100 m
Bioline


MORE EFFICIENT
Using the SPRAYVENT machine reduces losses due to falling to the ground by -76% at least
In a situation where there is 100% foliage cover, the reduction in losses due to falls to the ground increases up to -100%
Loss of product to the ground
Machine Sprayvent
Manual application
Proportion of mites falling to the ground
84 % viable
16 % losses
32 % viable
68 % losses
Bioline

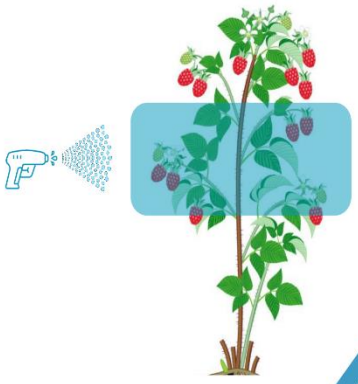
Notes

MORE ACCURATE

Application accuracy:
- Precise targeting of the area of the plant to be protected

Homogeneity of application:
- Homogeneous mixing = homogeneous application
  - Mites do not concentrate in certain areas as they can do in substrate
  - No blocks falls as with solid substrates

Homogeneity and accuracy of application



Bioline AgroSciences

EASIER

Fewer constraints

Easy to apply: no operator variability	→ The machine is easy to use and consistently doses predatory mites
Leaves no visible substrate on plants	→ Low-dose, food-grade additive, water soluble and transparent
Very low volume of water	→ 10 L of water per hectare, negligible effect on disease risk
Reduces the volume of packaging	→ The absence of substrate reduces the volume of packaging by a factor of 5: less waste, reduced ecological impact linked to transport

Bioline AgroSciences

Sprayvent

Trial results

Notes

Trials n°1 on roses

OBJECTIVES :
- Measure application time
- Calculate losses on the ground

Release trial results

The use of the SPRAYVENT machine reduces the average application time by 14%

Machine Sprayvent: 46 seconds

Manual application: 53 seconds

Average time to complete 1 row

14 % time saved

Location:
- Rose greenhouses in Kenya– Naivasha - Kingfisher farm in greenhouse 72

Treatments:
- M1- Manual application
- M2 -Application Sprayvent
- T -Control

Dose rate:
- Identical doses for M1 and M2 (50 *Phytoseiulus* per m²)
- No application in the control

Frequency of application:
- Weekly

Micro-plot size:
- 8 bays of 8 rows each
- Row length: 58 m

Measurements:
- Application time per row in seconds
- Uniformity of application: count the number of *Phytoseiulus* in 10 randomly selected areas
- Losses on the ground: count of *Phytoseiulus* on sticky traps placed on the ground

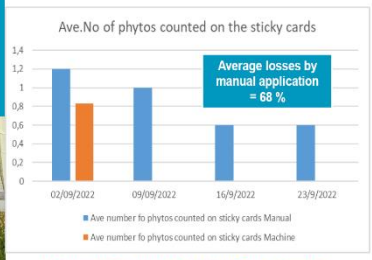
Bioline AgroSciences

Trials n°1 on roses

OBJECTIVES :
- Measure application time
- Calculate losses on the ground

Release trial results

The SPRAYVENT machine reduces losses which fall to the ground by -76% at least*



*It is assumed that the losses on the SPRAYVENT modality during the first count are related to the fact that leafcover was less than 100%

Location:
- Rose greenhouses in Kenya– Naivasha - Kingfisher farm in greenhouse 72

Treatments:
- M1- Manual application
- M2 -Application Sprayvent
- T -Control

Dose rate:
- Identical doses for M1 and M2 (50 *Phytoseiulus* per m²)
- No application in the control

Frequency of application:
- Weekly

Micro-plot size:
- 8 bays of 8 rows each
- Row length: 58 m

Measurements:
- Application time per row in seconds
- Uniformity of application: count the number of *Phytoseiulus* in 10 randomly selected areas
- Losses on the ground: count of *Phytoseiulus* on sticky traps placed on the ground

Bioline AgroSciences

Bioline AgroSciences

Notes

Natutec Airobreez – new hand-held release system

Stella Cubison, Koppert UK

Notes

Notes

	Cultivation type	Surface area	Lay-out growing environment	Transport
Mini-Airbug	Covered	Small - scale	All	Walking
Airobreez	Covered	Small - scale	All	Walking
Mini-Airbug frame	Covered	Large - scale	Two row veg crops	Scissor freight lift
Airobug	Covered	Large - scale	Full crops	Monorail / piperail
Vegetable frame	Covered	Large - scale	High wired crops	Monorail / piperail
Distribug	Covered	N.A.	Plant tables (ornamentals)	N.A.
Drive - release system	Covered / outdoor	Large - scale	Row crops	Piperail / tractor-mounted
Drone - release system	Outdoor	Large - scale	All	Mav Link Drone

PRODUCT LAUNCH

Natutec Airobreez

Notes

Natutec Airobreez

Our cutting-edge new handheld blower!!

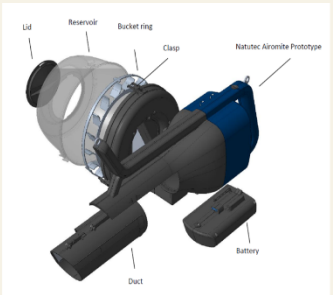
- Extreme low mortality
- Uniform and precise distribution
  - Double duct: reach 0 – 4 metres
  - Lineair airstream
  - Paddle dosage system
- No loss of material
- Easy to use

Blower Portfolio

	Natutec Mini-Airbug	Natutec Airbug	Natutec Airobreez	Natutec Mini-Airbug frame	Natutec Airobug	Natutec Vegetable frame
Blowing distance	0,5 - 2 metres	2 - 3 metres	0 - 4 metres	2x (0,5 - 2) metres	2x (0 - 5 metres)	2x (2 - 3) metres
Airflow shape	blanket	blanket	conical shape	blanket	conical shape	blanket
Reservoir	open 1,5 litres	open 3 litres	closed 3 litres	open 1,5 litres	open 3-5 litres	open 3 litres
Max Morality	8%	8%	2%	8%	8%	8%
Dosage system	dosage pot	dosage pot	paddle dosing system	dosage pot	dosage pot	dosage pot
Vegetable cultivation	yes	yes	yes	tomatoes	yes	high wired crops
Floriculture	yes	yes	yes	no	yes	no
Transport	walking	walking	walking	pick up trolley	trolley from grower	trolley from grower
Monorail system					yes	yes
Piperail system					yes	yes

Product Information

- Product code EU:
- Product code NA:
- Hardcase
- Seven components
- Shoulder strap
- Battery charger
- Battery life: 2 hours (at it's maximum setting)
- Blowing distance: 0 – 4 metres
- Reservoir capacity: 3 litres
- Settings: 15 adjustable options
- CE certication
- UL pending



Notes

NATUTEC®
by Koppert

All product information here

Notes

TruePest, an AI driven Smart Monitoring Ecosystem for thrips and whitefly, and 'Push-Pull' IPM techniques for the control of thrips

Andrew Russell, Russell IPM Group

Notes

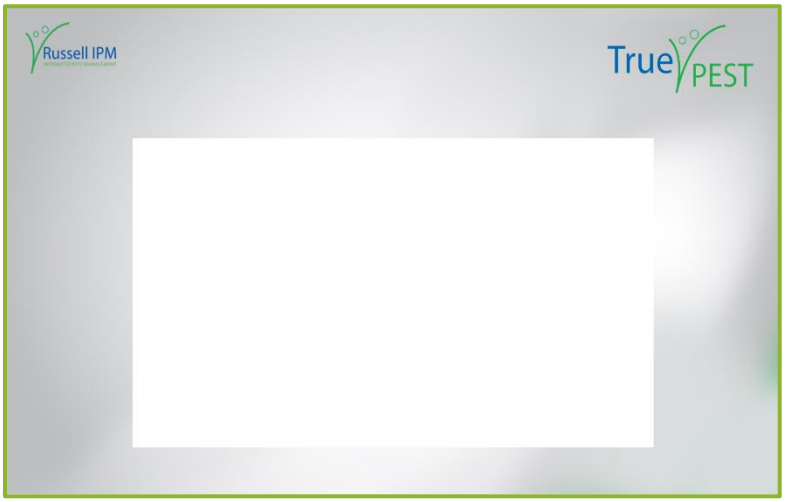
Notes

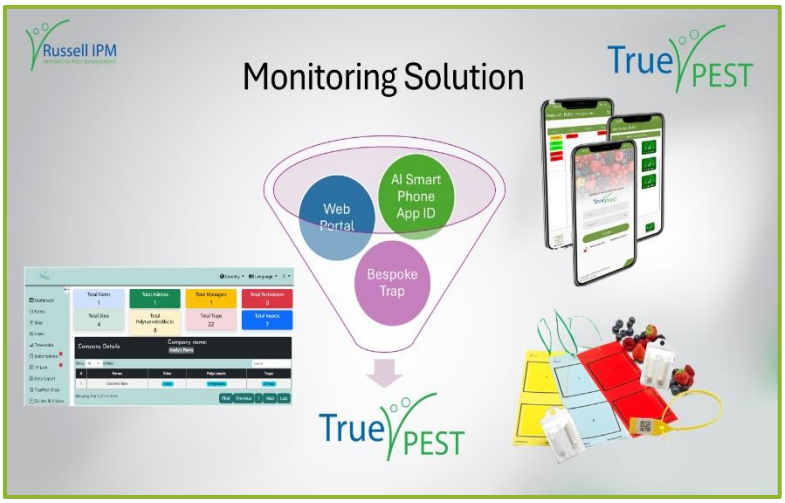

Russell IPM
TruePEST
Agenda
1) TruePest
SWD, Thrips and Whitefly
2) Push-Pull Techniques
for Thrips

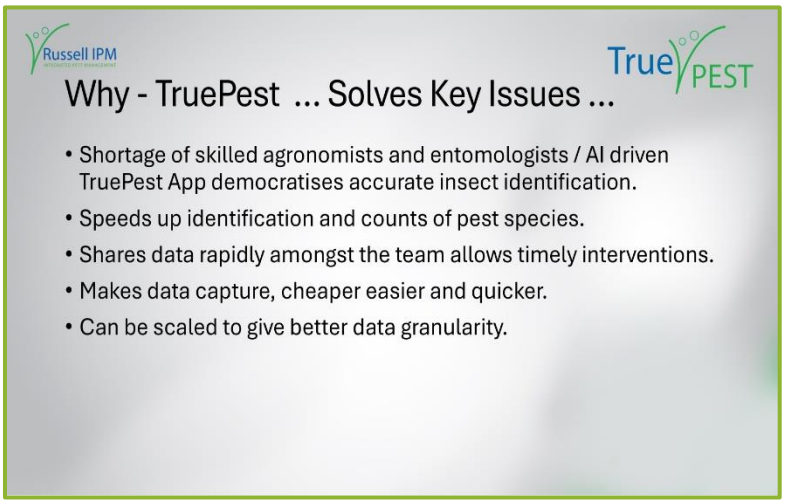

Intelligent insect detection system
TruePEST
E-mail
Password
Login
Remembre me
Forget password ?


Russell IPM
AI-Powered Insect Monitoring for Smart Farms
Empower your farm with AI-driven insect monitoring solutions that enhance efficiency and sustainability
TruePest is an advanced pest-monitoring solution that utilizes AI technology to detect and manage insect populations. It's designed to provide efficient and accurate monitoring for various environments, such as farms, ensuring early detection and effective management of pests.
TruePest uses strategically placed monitoring boards that attract and capture pest insects for analysis. It is equipped with AI technology to intelligently identify and categorize pest insects. Once a pest is detected, the system generates alerts and reports for effective pest management.

Notes


Russell IPM
TruePEST


Russell IPM
Monitoring Solution
TruePEST
Web Portal
AI Smart Phone App ID
Bespoke Trap
TruePEST


Russell IPM
TruePEST
Why - TruePest ... Solves Key Issues ...
• Shortage of skilled agronomists and entomologists / AI driven TruePest App democratises accurate insect identification.
• Speeds up identification and counts of pest species.
• Shares data rapidly amongst the team allows timely interventions.
• Makes data capture, cheaper easier and quicker.
• Can be scaled to give better data granularity.

Notes

Russell IPM

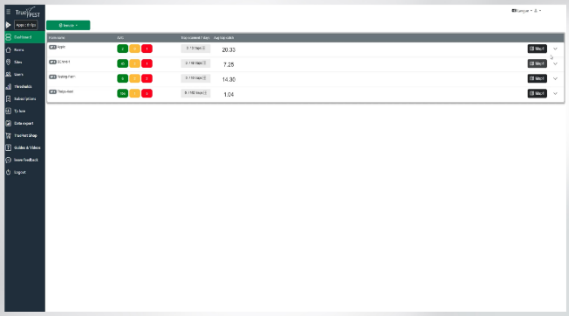
True PEST

❖ Scanning the trap

Russell IPM

True PEST

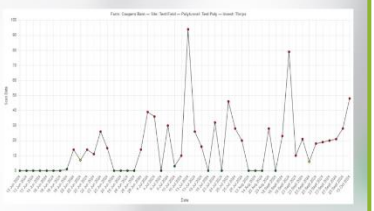
Outputs



Russell IPM

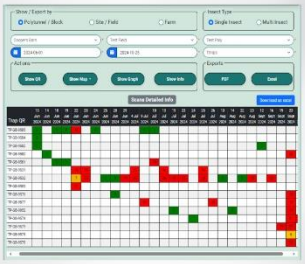
True PEST

Outputs

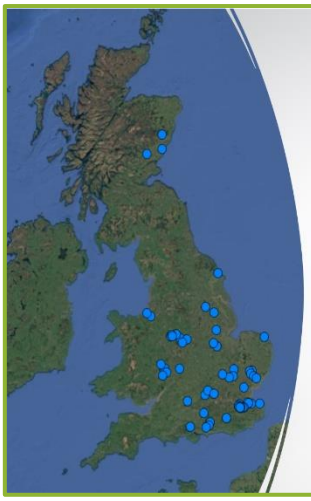


Notes

Outputs



SWD Module 2024 b Trial



- 75 business's directly using TruePest.
- Inc. complex businesses, x3 multi-site management companies and numerous multi-site growers.
- Soft fruit / stone fruit and vineyard.
- Average 34 traps per farm.

Total Companies 80	Total Admins 134	Total Managers 41	Total Technicians 34
Total Farms 142	Total Sites 539	Total Polys|Blocks 1075	Total Traps 2917

Changes for Launch 2025

- New App and AI model.
- Red trap for SWD, blue for thrips, yellow for whitefly.
- Move from x3 to x2 boxes.
  - Even quicker trap monitoring.
  - 1/3 less pictures.
  - Further reduced processing time.
  - Picture stays on portrait.
- Improved web portal / results dashboard.
- Easier / more intuitive data interface on web portal.
- Change to supported phones- iPhone 13 Pro and Samsung S21 and more advanced supported. Older models not sufficiently accurate.

Notes

Russell IPM

Trap Type Comparison – Per Trapping Point

	TruePEST	Std. Sticky Trap	Traditional Wet Trap	Insitu Remote / Camera Trap System
Up front capital cost	Medium / Low	Low	Medium	Very High
Running cost	Low	Low	Medium	High
Set up time	Medium	Medium	Medium	High
Time to monitor per trap by grower staff / per week	4 min	15 – 20 min	40 – 45 min	
Accuracy of counts	AI driven High 95% Accuracy / High Consistency*	Variable by operative	Variable by operative	Variable by operative
Operator skill level required to monitor on farm	Low	High	High	Low
Est. equipment cost per year	£45.00	£11.70	£65.48	High
Est. labour cost per year (£25 p/hr)	£71.50	£362.50	£760.00	Low (in subscription)
Est. cost per trap per year	£111.50	£381.59	£825.48	TBC
Graularity of sata	Can be deployed at scale as lower cost and less time to monitor. More trapping points – more granular data	Limited as time consuming to monitor	Limited as time consuming to monitor	Low due to high cost
Data sharing	Instant Via App, and Cloud based web-portal + reports	N/A	N/A	Alerts / Reports

* Using I Phone 13 Pro / Samsung S21 and newer.

Russell IPM

TruePEST

Evolving the TruePest Monitoring EcoSystem

- Future plans

- Using the TruePest architecture we will expand the TruePest Ecosystem of species into:
- Thrips and whitefly / soft fruit, glasshouse, ornamentals: 2025
- Thrips soft fruit, field veg: 2025
- Moths, top fruit, vineyard and sugar beet: 2026
- Other fly species, field veg: 2026

Fly Pests
Live - 2025 SWD
Evolution for 2026
Bean Seed Fly
Carrot Fly
Swede Midge

Thrips
Live 2025 – Total Thrips
May / June 2025

TruePest EcoSystem & Evolution

Moths Module
Evolution for 2026
Codling Moth
Light Brown Apple Moth
European Grape Moth
Beet Moth

Whitefly
Live 2025 – Total Whitefly
May / June 2025

Russell IPM

TruePest Thrips and Whitefly

- Powerful dual thrip lure – kairomone and pheromone combination.
- Blue sticky trap for thrips.
- Yellow sticky trap for whitefly.
- No lure required for whitefly.
- Quicker, easier and cheaper data capture.
- Rapid and real time total thrip and total whitefly counts.
- Instant data access (App) and sharing (web-portal).
- Intuitive data analysis via platform.
- Annual box kits with all equipment and app and system access in the price.
- 1-month free trial kits available. TruePest Thrips / TruePest Whitefly.

- Thrips – 20 -100 TruePest trapping points per ha.
- Large glasshouse 1trap - 500m^2.
- Grid pattern + hot spot and high-risk area monitoring.
- More traps per ha in smaller glasshouses.

Notes


Russell IPM
artificial intelligence
fruit&vine
TruePEST
AI-Powered
TruePEST SWD
Monitoring Kit
AI driven smart monitoring system
for Spotted Winged Drosophila D. suzukii
Part of the TruePest Ecosystem of smart monitoring solutions for growers.
Kits contains equipment for 25 trapping points for 12 months.
To be used in conjunction with TruePest App and Website
www.truepest.net
25
trapping point kit
Thank you ....

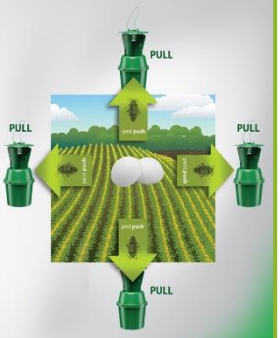

Thrips - Push-Pull Strategies
Russell IPM
• Our Product Range – An IPM Tool Kit
• What is a Push – Pull Strategy ?
• Optiroll Range
• MagiPal
• ThripNok
• Push-Pull in Verbena – Case study


Traps and Lures
Russell IPM
High quality mass trapping at its best with Optiroll, Optiroll Super and Optiroll Super Plus.
More than 150 pheromone and kairomone lure types available.
Long lasting, robust traps, optimised to catch and retain target pests.

Notes

What is push-pull?

- Combine stimuli to:
  - **Push** pest out of crop.
  - **Pull** natural enemies to the crop.
  - **Pull** pest toward a trap.
- Generally nontoxic.
- Compatible with biological control and other methods.



Commercial Push-Pull Strategies

Aphids

- Magipal
- Natural Enemy attractant
- Combine with pheromone traps / natural enemies

Thrips

- Magipal and Thripnok
- Natural Enemy attractant
- Pheromone roller trap Optiroll Super Plus

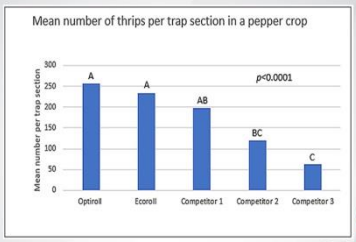
Midges

- Magipal
- Pheromone Roller trap Optiroll Super Plus

Capsids

- Lybolty
- Capsid pheromone
- Greenvane traps / Blue Impact sticky traps

Optiroll



Notes

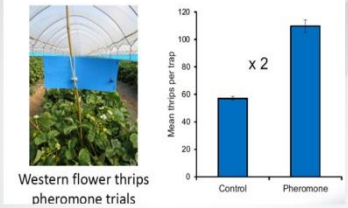

Optiroll
Russell IPM
Thrips trap catch
Yellow
White
Light Blue
Dark Blue
Trap colour
Whitefly trap catch
Yellow
White
Light Blue
Dark Blue
Trap colour


Optiroll
Russell IPM
Morocco peppers
Mean thrips per trap section
Optiroll
Optiroll super
UK strawberry
Mean thrips per trap section
Optiroll
Optiroll super

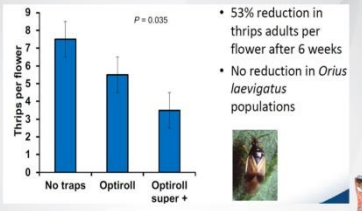

Optiroll
Russell IPM
Optiroll
Optiroll super
Thrips per m of trap
31-Mar
07-Apr
14-Apr
21-Apr
28-Apr
05-May
Glass house Strawberry, Spring crop.
Pattern (Optiroll Super increases trap catch +17%)

Notes

Optiroll



Optiroll



- 53% reduction in thrips adults per flower after 6 weeks
- No reduction in *Orius laevigatus* populations

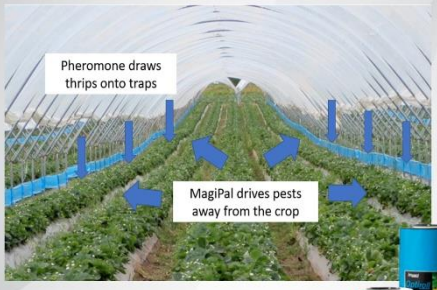
MagiPal, Natural Enemy Attractant

- **Combine with traps and lures for push-pull strategy.**
- **Combine with natural enemies to improve biocontrol.**
- Plant defence compound, protects against disease and pests.
- Attracts natural enemies.
- Insect repellent, repels many species: thrips, capsids, weevils, SWD, midges +.
- Lasts 2-3 months (temperature dependent).

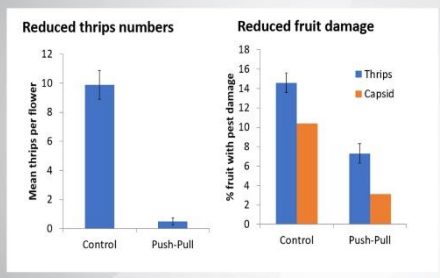
- Rate: 100/120 up to 180/ha
- 10m spacing

Notes

Push-Pull in strawberry – Western flower thrips



Push-Pull thrips results



Thripnok: A two-component kairomone lure

Thripnok

What is Thripnok?

- Kairomone attractant lure of mixed scents
  - *S*-Verbenone (Abdullah, 2015)
  - *P*-Anisaldehyde (Koshier, 2000)

Japanese flower thrips
Thrips setosus

Rose thrips
Thrips fuscipennis

Why Thripnok?

- Increased response of western flower thrips.
- Less specific (attracts more species).
- Increasing pest status of flower-dwelling thrips species.
- Combining two scents may broaden the response:
  - More species attracted.
  - Better competition with floral scents.

Trial sites, strawberry (UK), cucumber (Canada), basil (Kenya)

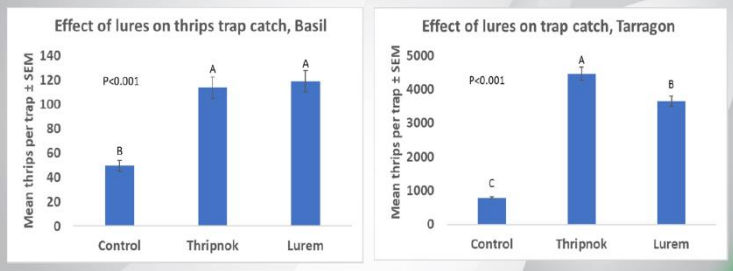
Factor of increase with Thripnok

Crop	Thripnok performance			
	Temp °C	Height above crop	Factor increase	P
Strawberry*	6-15	10 cm	x 3.4	0.001***
Strawberry	14-28	10 cm	x 2.3	0.001***
Cucumber	19-26	150 cm	x 1.7	0.001***
Basil	18-32	10 cm	x 2.5	0.001***
Tarragon	18-32	10 cm	x 5.7	0.001***

* <2 flowers per plant. Comparisons used ANOVA

Notes

Thripnok trial results
Basil and Tarragon, Kenya 2021



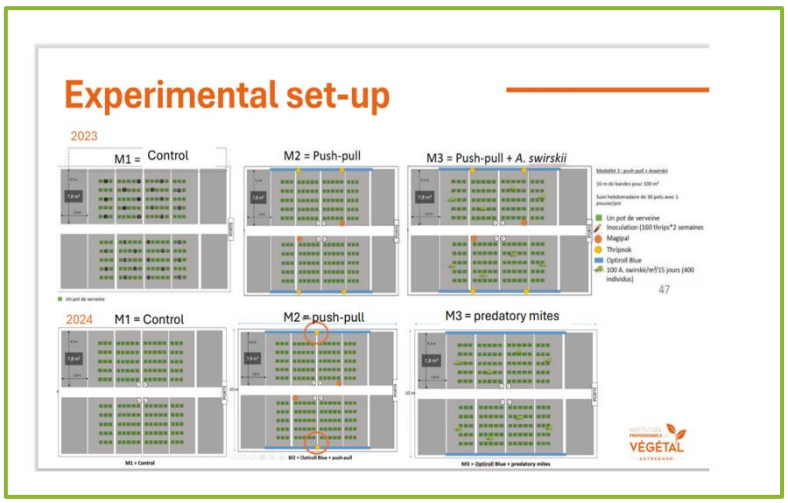
Thipnok increased thrips trap catch by x 2.3 and x 5.7

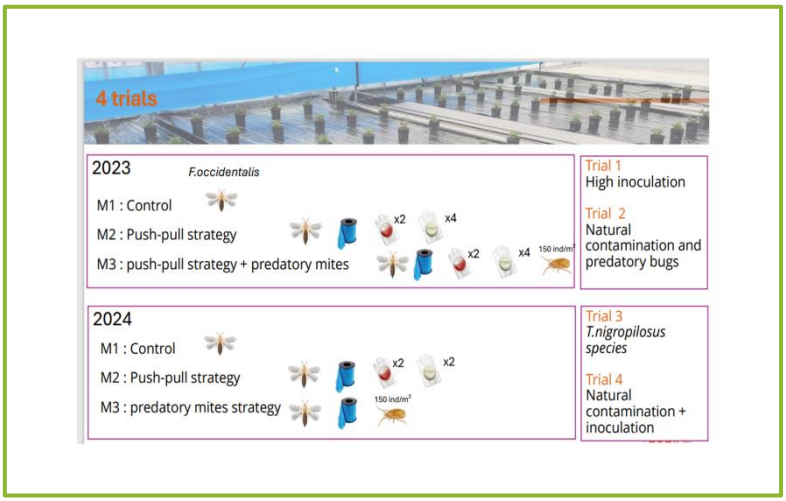
How is Thripnok being used?

A monitoring tool that can be used in all protected crops:	Can be combined with a range of pest management strategies:
Improves early detection of thrips	Mass trapping with sticky traps and Thripnok is used in fruit, vegetable and flower crops
Increases trap catch	Push-pull strategies combining Thripnok and traps with natural enemy attractant (Magipal)
Attracts a wider range of thrips species	**Synergistic for insecticide and biological treatments, as Thripnok draws thrips out of flowers, making them easier to target**

Notes

Notes

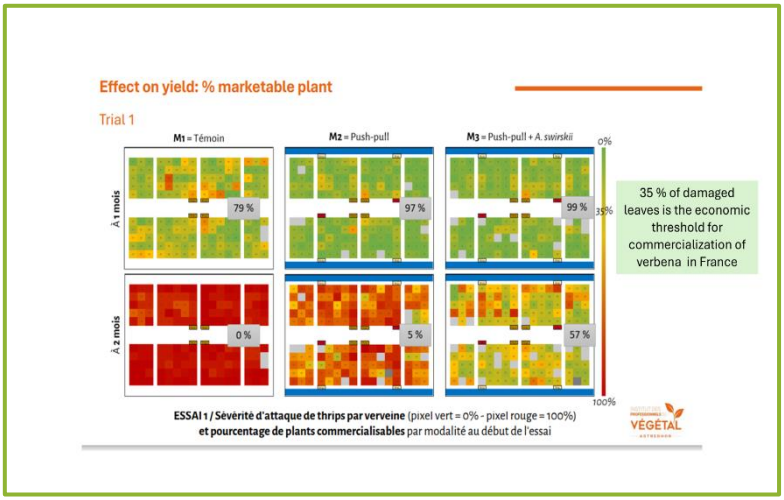

Experimental set-up
2023
M1 = Control
M2 = Push-pull
M3 = Push-pull + A. swirskii
2024
M1 = Control
M2 = push-pull
M3 = predatory mites


4 trials
2023
F.occidentalis
M1 : Control
M2 : Push-pull strategy
M3 : push-pull strategy + predatory mites
Trial 1
High inoculation
Trial 2
Natural contamination and predatory bugs
2024
M1 : Control
M2 : Push-pull strategy
M3 : predatory mites strategy
Trial 3
T.nigropilosus species
Trial 4
Natural contamination + inoculation


ASTREDHOR
Action 2 - Push-pull 2023 Verveine
Russell IPM
Push-Pull in Verbena
PULL
PUSH
Répulsif : Magipal
. Solution de tannins qui repousse les ravageurs et attirent les auxiliaires
. Durée diffusion : 2-3 mois
. Dose 180 lures/ha at 10 m intervalles - 3 € unité
. Réduction nb de thrips de 95% en fraise UK
Attractifs
Thripnok
. Combinaison de 2 odeurs de fleurs (anisaldehyde et verbenone) en blister pack
. Dose 120 lures/ha at 10 m intervalles
3,5 € unité
. Attire plusieurs espèces de thrips
+
Optiroll Blue
. Bande engluée bleue qui double la capture des thrips
. 10 à 12 unités de 100 m/ha
. 40 €/100 m

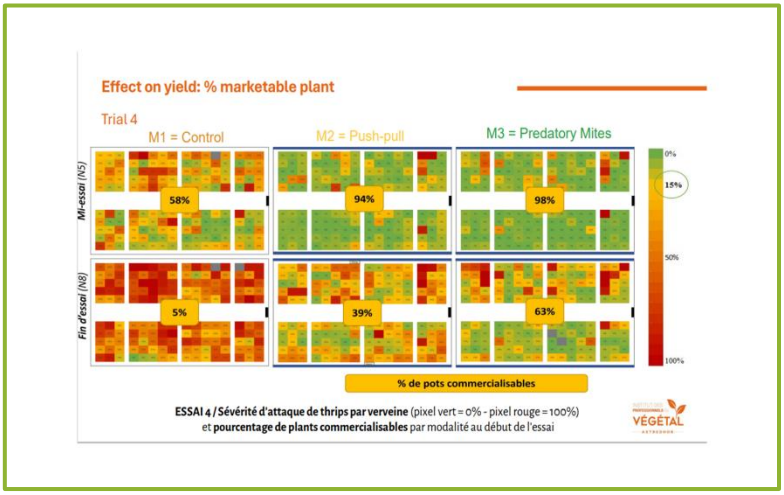
Notes


Effect on the number of thrips on the whole plant after 2 months
Trial 1
Trial 2
Trial 4
Nombre moyen d'individus par plante après 2 mois d'essai
Témoin
push-pull
push-pull + A.swirskii
Adultes
Larves
Macrolophus
Orius
-73%
-87%
-82%
-93%
-39 %
-79 %
Témoin > Push pull > A.swirskii > A.swirskii + push-pull
Push-pull strategy compatible with Biocontrol Agents
Competition /flowers
Duration of effectiveness
VÉGÉTAL


Effect on yield: % marketable plant
Trial 1
M1 = Témoin
M2 = Push-pull
M3 = Push-pull + A. swirskii
À 1 mois
À 2 mois
79 %
97 %
99 %
0 %
5 %
57 %
0%
35%
100%
35 % of damaged leaves is the economic threshold for commercialization of verbena in France
ESSAI 1 / Sévérité d'attaque de thrips par verveine (pixel vert = 0% - pixel rouge = 100%)
et pourcentage de plants commercialisables par modalité au début de l'essai
VÉGÉTAL


Effect on yield: % marketable plant
Trial 2
M1 = Témoin
M2 = Push-pull
M3 = Push-pull + A. swirskii
À J0, date des catégories de dégâts
À 1 mois
À 2 mois
69%
70%
69%
21%
32%
38%
3%
72%
100%
0%
35%
100%
35 % of damaged leaves is the economic threshold for commercialization of verbena in France
ESSAI 2 / Sévérité d'attaque de thrips par verveine (pixel vert = 0% - pixel rouge = 100%)
et pourcentage de plants commercialisables par modalité au début de l'essai
VÉGÉTAL

Notes


Effect on yield: % marketable plant
Trial 4
M1 = Control
M2 = Push-pull
M3 = Predatory Mites
M1-essai (N5)
Fin d'essai (N8)
58%
94%
98%
5%
39%
63%
0%
15%
50%
100%
% de pots commercialisables
ESSAI 4 / Sévérité d'attaque de thrips par verveine (pixel vert = 0% - pixel rouge = 100%)
et pourcentage de plants commercialisables par modalité au début de l'essai
VÉGÉTAL


Russell IPM
Contact us:
Andy Russell
andrew.russell@russellipm.com
07798 714948
info@truepest.net
Rachel Turner
Rachelturner@russellipm.com
07741 006219
artificial intelligence
fruit&vine
TruePEST
AI-Powered
Thank you ....

Where next with biological pest control?

Selchuk Kurtev, Zest – Sustainable ICM

Notes

Where next with biological pest control

Selchuk Kurtev, Zest Sustainable ICM

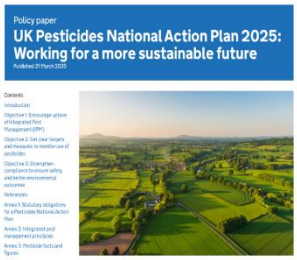
WHAT I WILL COVER

- UK Pesticides National Action Plan 2025 (NAP2025)
- Short-term (3-5 years) trends
- Medium-term (5-10 years) trends
- Long-term (10 years+) trends
- Summary

UK Pesticides National Action Plan 2025

1. *'Encourage **uptake** of IPM*
2. *Set **clear targets to monitor** use of pesticides*
3. ***Strengthen compliance** to ensure safety and better **environmental outcome**'*

- To address the 18 actions stated, many of them lack detail:
- 10 actions to encourage uptake
- 4 actions to set targets to monitor
- 4 actions to build and strengthen compliance



Notes

UK Pesticides National Action Plan 2025

Encourage uptake:

- Increase knowledge and implementation of decision support tools
- Training provision and funding for research
- Precision application and use of drones
- Evidence based horizon scanning of gaps
- Support biopesticide applications and their approval
- Specify major crop as lagging on uptake

UK Pesticides National Action Plan 2025

Setting targets to monitor:

- Work with organisations collecting data behind the indicators from previous NAP to update, improve and replace existing indicators
- All 4 governments to work with regulatory bodies to agree indicator framework for producing monitoring reports
- Assess progress against targets
- Publish biennial reports on results

UK Pesticides National Action Plan 2025

Strengthen compliance:

- Commission a project to review where data can further inform a risk-based approach to compliance
- Industry/assurance schemes might be considered as part of assessing users' risk profiles, targeted inspections
- Update of the 'Code of practice for using plant protection products' (and the 'Code of practice for suppliers of pesticides to agriculture, horticulture, and forestry')
- Engage with online marketplaces for online sales of professional PPP to increase visibility of the legal requirements

Notes

UK Pesticides National Action Plan 2025

What does it really all mean:

- ✓ Recognition of the need for pesticides
- ✓ Clear target on reduction of pesticides use
- ✓ Large broadacre crops identified as key area to increase the uptake of IPM
- ✓ Bio-control agents and biopesticides clearly promoted
- ✓ Updates to monitoring and reporting of the use and uptake of IPM
- ✓ More training and update on statutory instruments
- ✓ More rigorous compliance coming our way
- ✓ Importance of assurance schemes and industry bodies
- ✓ Better control of online sales of PPP
- ✓ Targeted risk-based inspections

SHORT-TERM

- ➢ Decision support tools
- ➢ Digitised agronomy
- ➢ Introduction formats – labour cost savings
- ➢ New species and improved production systems, strains and formulations
- ➢ Precision application and delivery methods
- ➢ Conservation of habitats and reduction of impact on beneficials on whole farm approach
- ➢ Bee Vectoring Technology (BVT)
- ➢ Sterile Insect Techniques (SIT)

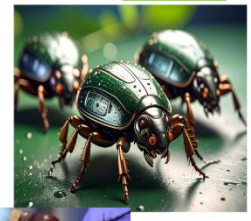
MEDIUM-TERM

- ➢ Genetically engineered biocontrol agents
- ➢ New species and improved production systems, strains and formulations – Super bugs!
- ➢ Entrance of field introductions of biologicals through drones etc
- ➢ Crop genetic improvements and selections – removing predatory mite barriers, VOC attractants etc

Notes

LONG-TERM

- Cyborg insects, nanobots??
- Remote controlled predatory insects??
- Unlikely to happen within the next 10 years BUT…
- Improvements will reach new height of effectiveness
- Crop production system changes in parallel



SUMMARY

- Digitised crop monitoring and decision support uptake
- Precision delivery methods improvement
- Bio-control agent strains and improvement to formulations
- Utilising the whole farm IPM
- Increased costs to farming businesses over short period of time
- Stringent compliance in future and evidence-based approach
- Speed of uptake is likely to increase in short- and medium-term

NURSERY PRODUCTION

Zest-ICM

0333 005 0167

nurseryproduction@hta.org.uk

Sustainable ICM

Appendix

1. How to crop monitor - https://www.youtube.com/watch?v=IqXLutRZ0GI
2. Top 5 Tips Before You Start Your Biological Control Programme - https://www.youtube.com/watch?v=COkT8yJj5PA
3. Biological maintenance – the right tools, at the right time, in the right place - https://www.youtube.com/watch?v=j-RcWgNwvnU
4. IPM Application Techniques - https://www.youtube.com/watch?v=QRv7TVpL408
5. Selection and use of biological control agents in production of ornamental crops - aphid and whitefly - https://www.youtube.com/watch?v=0UxPqztz7N0
6. Selection and use of biological control agents in production of ornamental crops – mites and thrips - https://www.youtube.com/watch?v=bYndw8Rptgk
7. Thrips control on protected ornamental crops - https://projectbluearchive.blob.core.windows.net/media/Default/Horticulture/Publications/Thrips%20control%20on%20protected%20ornamental%20crops.pdf
8. BioControl Introduction - Part 1 (English) - https://www.youtube.com/watch?v=GF2O5nh53ns
9. Boosting Biocontrols Within IPM Programmes - https://projectblue.blob.core.windows.net/media/Default/Horticulture/Publications/Boosting%20Biocontrols%20Within%20IPM%20Programmes.pdf
10. Sticky Traps Tips - https://www.youtube.com/watch?v=76zv7d_Zrq8
11. Thrips identification poster - https://horticulture.ahdb.org.uk/knowledge-library/thrips-identification-poster
12. Factsheet 24/16 Vine weevil control in hardy nursery stock – https://projectbluearchive.blob.core.windows.net/media/Default/Imported%20Publication%20Docs/Vine%20weevil%20control%20in%20hardy%20nursery%20stock.pdf
13. Factsheet 18/14 Getting the best from biopesticides – https://projectbluearchive.blob.core.windows.net/media/Default/Horticulture/Publications/Getting%20the%20best%20from%20biopesticides.pdf
14. Factsheet 06/10 Grower systems for rearing the predatory beetle *Atheta coriaria* - https://projectblue.blob.core.windows.net/media/Default/Horticulture/Publications/Grower%20system%20for%20rearing%20the%20predatory%20beetle%20Atheta%20coriaria.pdf
15. Factsheet 08/05 The biology and control of two-spotted spider mite in nursery stock - https://projectbluearchive.blob.core.windows.net/media/Default/Horticulture/Publications/The%20biology%20and%20control%20of%20two-spotted%20spider%20mite%20in%20nursery%20stock.pdf
16. Factsheet 08/02 Control of sciarid flies in protected ornamentals - https://projectblue.blob.core.windows.net/media/Default/Horticulture/Publications/Control%20of%20Sciarid%20flies%20in%20protected.pdf

www.hta.org.uk

www.zest-icm.co.uk