

REFERENCE CATALOG

BIOLOGICAL METHOD OF PLANT PROTECTION





OUR MISSION

Our mission is to reduce the use of pesticides and to stop the degradation of natural ecosystems. We create alternative technologies and methods of protection that solve pest problems and create sustainable systems based on natural balance models.

IPM - INTEGRATED PEST MANAGEMENT

The integrated method is based on the use of laboratory grown natural predators, biological products, baculoviruses, compatible chemistry, and drugs to enhance plant immunity. The foundation of the method is a deep knowledge of ecology, biology and chemistry, which is used in time in preventive programs and protection strategies.

IPM is a complex of preventive measures aimed at creating a balance



**THIS CATALOG CONTAINS ENTOMOPHAGES AND SOME RELATED TOOL
PRODUCTS WHICH ARE USED IN PROTECTION PROGRAMS**

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SAY "YES" TO BIOLOGY!

Bio Protection LLC is a part of Bioprotection Corporation. Other companies which are inside:

- BioProduction – production of entomophages for plant protection.
- Agrolabs – development and production of equipment for crops control during crop rotation.
- Agro System Group – consultancy on crop growing in open soil.
- GMP satellite – development and implementation of software and GPS systems.

OUR ADVANTAGES:

WE ARE MANUFACTURES

12 types of commercial entomophages, more than 40 types of packaging, 4 biofactories. Thanks to three lines crossing technology, our entomophages have high rates of predation, selective resistance to pesticides, they fix on plants quickly and hunt for the wide range of pests.

QUICK LOGISTICS

Delivery by air and by road. Maximum delivery time is 6 days since the order.

EFFECTIVE PROTECTION

We guarantee high-quality plant protection to our customers in accordance with the requirements of the IPM method and put the result above the momentary earnings.

COMPLEX PRODUCT

Thanks to the BioController software, you save your money and organize your team's knowledge. Buying our entomophages, additionally you receive all the experience of our technologists.



We work for the result - the protected harvest of our customer!

PATENTED TECHNOLOGY OF PREDATORY MITES CROSSING



Lines crossing technology is a method of mass production of more effective predatory mites. It is realized by means of a step-by-step interline crossing of trophic races (lines), previously propagated on several different food substrates.

12 TYPES



3 parent lines
feed lines
types of substrate

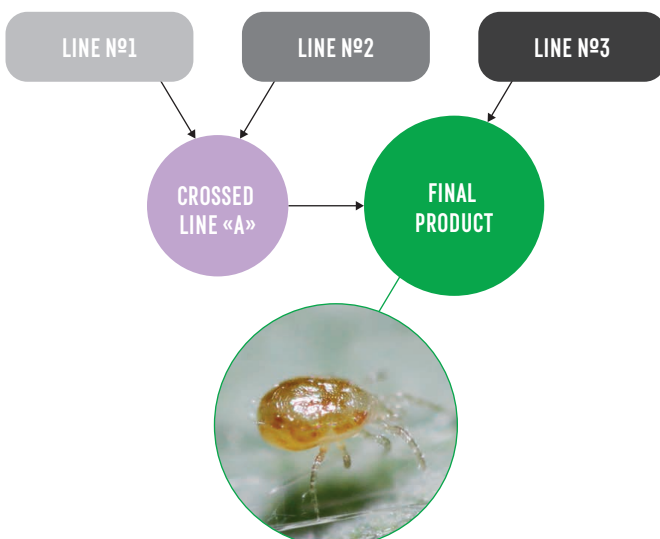
ADVANTAGES OF LINES CROSSED PREDATORY MITES

F1

LINES CROSSED MITES ARE MORE EFFECTIVE THAN ANY SEPARATE PARENT LINE:

- Life period in a greenhouse is 40% higher. The search ability of offspring is 20-35% higher.
- The reproductive potential and fertility of females is 20% higher.
- Rapid settling over the plant. Eating of pests is increased by 1.2 times.
- Increased target range: various species of herbivorous mites (Prostigmata), thrips (Thripidae) and whiteflies (Aleyrodidae).
- Better tolerance to unfavorable hydrothermal conditions of the environment.

MAIN FACTORS OF OBTAINING HIGH QUALITY MITES



- Purity of the population (breeding stock are systematically updated).
- Biolaboratory software (on-line control of production).
- Genetic control of the line type in the independent laboratory.
- Control of transportation from the lab to the greenhouse.
- Additional feed additives that are rich in biologically active substances.
- High requirements for the cleanliness and accuracy of production processes, organization of logistics and management.



BIO|CONTROLLER

BIOCONTROLLER – DATA PLATFORM FOR PROTECTED SOIL

Biocontroller is a package of crop protection technology management in greenhouses. This production monitoring and production analyzing system is used by:

150+ large scale greenhouse complexes

1100+ hectares of protected soil.

The system allows to control important production processes from growing seedlings to harvesting. Thanks to this, the technology is constantly being improved and the yield of crops is increasing.

WE CREATE THE MOST CONVENIENT CONTROL SYSTEM. THE FOLLOWING INNOVATIONS ALLOW TO ENTER THE DATA AUTOMATICALLY:

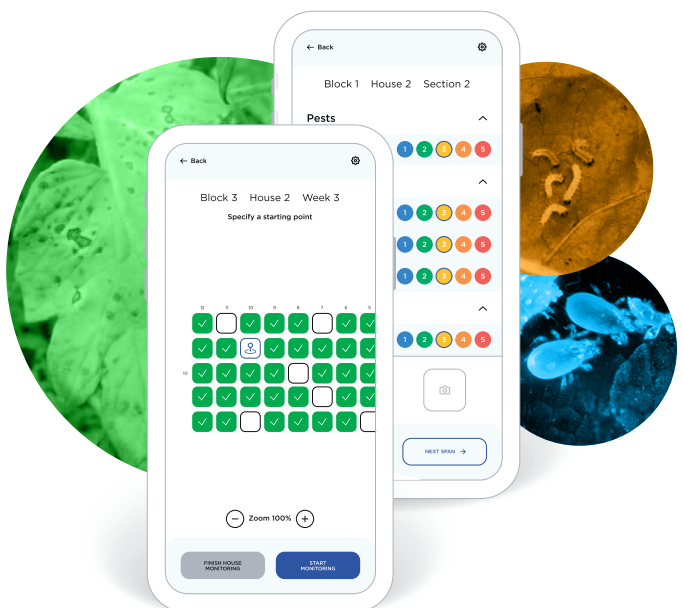
- Pollination monitoring with B-Control – hives condition control and pollination quality control.
- Substrate control with W-sens – economy of irrigation water and fertilizers.
- Mobile applications for pest monitoring. Microclimate control.
- Drones - surveyors for monitoring of plants condition and for spreading of bio-fertilizers application.



ABOUT SYSTEM

MOBILE BIOCONTROLLER

For fast plant monitoring and quality control of surveys in a greenhouse.



All options for data analysis in the BIOCONTROLLER platform were recommended and based on the experience of the greenhouse agronomists.

BIOCONTROLLER - ANALYTICAL SYSTEM

Bio Protection LLC develops this system together with experienced practicing technologists, and due to this fact the working processes and the system interface are constantly being improved.

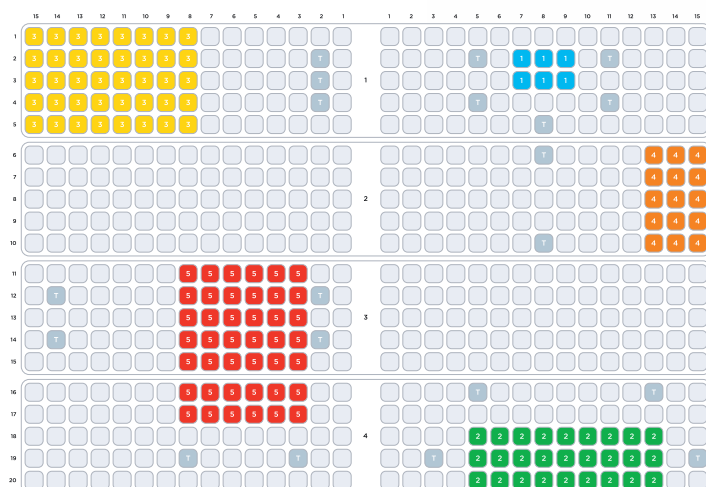
REFERENCE BOOKS

Reference books on pests, diseases, pesticides, entomophages are the basis for plants area monitoring. Thanks to this, the process of data input is accelerated and the generation of reports is automated.

ANALYTICS OF PLANTS AREA MONITORING

- The damage degree of plants by pests on a specific date.
- The pest development dynamics by species, by week and season.
- The plant diseases spreading dynamics.
- Spreading of entomophages depending on the type of crops.
- The reports demonstrate the spreading dynamics of different pest types, pest outbreaks and the entomophages efficiency.

MONITORING MAP

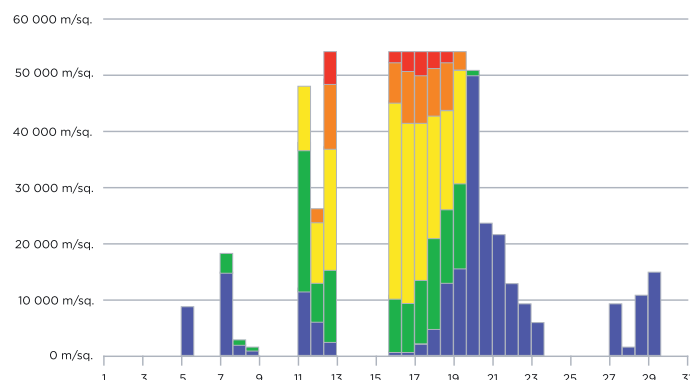


Weekly monitoring map – different colors indicate the level of pest spreading over the greenhouse area.

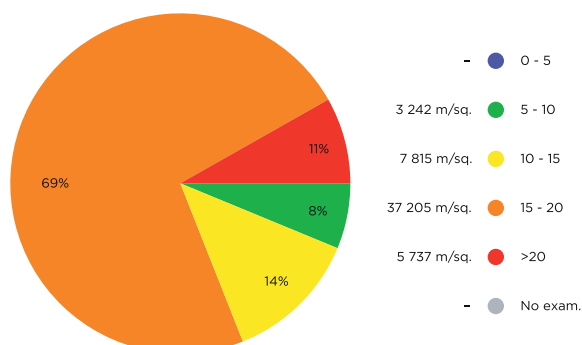
Diagram – indicates the damage level of the total area based on the monitoring map.

Graph – dynamics of pest spreading in a greenhouse on weekly base.

GRAPH



DIAGRAM





#BIOPROTECTIONSCHOOL – THE INSTRUMENT TO REALIZE THE BIOPROTECTION GLOBAL AIM:

To reduce the pesticides usage and to stop the natural ecosystems degradation owing to alternative technologies and protection methods which solve the problems with pests and create stable systems based on natural balance

#BIOPROTECTIONSCHOOL

- The group of training projects whose mission is to popularize biological methods of protection.
- Free online webinars and paid training programs facing the individual demands of our clients.

#BIOPROTECTIONSCHOOL – the association of like-minded people studying and popularizing the knowledge about sustainable systems of IPM.

THE PROJECT BRINGS TOGETHER EXPERTS AND LISTENERS FROM MANY COUNTRIES OF THE WORLD:



TRAINING METHODS

400+

Practical trainings of greenhouse workers since 2014.

120+

Reports on seminars, conferences, forums.

5

On-line platforms:



SUPPORT OUR PROJECT IN SOCIAL NETWORKS:

- Subscribe to actual news.
- Share the knowledge with the hashtag #BIOPROTECTION SCHOOL!

- Study the articles and reference books on the web-site.
- Visit the on-line events.

CHOICE OF ENTOMOPHAGES BASED ON CROPS AND PESTS																				
+++ Nice fixing and breeding	+++ Poor fixing	++ No fixing on crops	- Non-recomended	 No data	Neoseiulus cucumeris	Transeius montdorensis	Amblyseius swirskii	Neoseiulus californicus	Neoseiulus longispinosus	Neoseiulus stolidus	Hypoaspis miles	Atheta coriaria	Neoseiulus reductus	Adalia bipunctata	Aphidius colemani	Macrolophus pygmaeus	Steinernema feltiae	Steinernema carpocapsae	Trichogramma brassicae	Bombus terrestris
CULTURES																				
Tomato	-	+	-	+				+++	-			+++	+	+++	+++	+++	+++	+++	+++	
Cucumber	++	+++	+++	+++	+++			+++	+++			+++	++	+++	-	+++	+++	+++	+++	
Pepper	+++	+++	+++	+++				+++	+	++		+++	++	+++	++	++	++	++	+++	
Eggplant	++	+++	+++	+++				+++	+			+++		+++	+++	+++	+++	+++	+++	
Rose	+++	+	++	+++	+++	+++			++			+++	+++		+++	+++	+++	+++		
Herbera	++	+++	+	+++					++	+++		+++	+++	-	+++	+++	+++	+++	-	
Alstromeria	-													+++		+++	+++	+++	-	
Chrysantemum	++	+++	+	+++				+++				+++	+	+++	+++	+++	+++	+++	-	
Strawberry	+	++	+	++	+++			+++	+++	+++		+++	+++		+++	+++	+++	+++	+++	
Blueberry														+++			+++	+++	+++	+++
Raspberry		+		++	+++			+++				+++				+++	+++	+++	+++	+++
Grape									++			+++			+++	+++	+++	+++	-	
Apple														+++			+++	+++	+++	+++
Sweet cherry														+++			+++	+++	+++	+++
Pear														+++			+++	+++	+++	+++
Peach														+++			+++	+++	+++	+++
PESTS																				
Spider mites	+	+	+	+++	+++				-			+	-	+	-	-	+	-		
Tarsonemide	++	+	+	++				++	-	+		-	+++	-	-	-	-	-		
Thrips	+++	+++	++	-	-	+++	+++	+++				+		-	+++	+++	-	-		
Whiteflies	-	+++	+++	-	-	-	+++	-	++			+	-	-	-	-	-	-		
Aphids	-	-	-	-	-	-	-	-	+	-		+++	+++	++	-	-	+	-		
Scoop	-	-	-	-	-	-	-	-	-	-		+	-	+	+++	+++	+++	+++	-	
Tuta Absoluta	-	-	-	-	-	-	-	-	-	-		+	-	++	++	-	++	-		

PACKAGING

Hive 110
80



Tray 50 000 000
250 000 000



Envelope 1 000 000



LOOSE MATERIAL

For quick spreading of large quantities of predators. Very quickly it creates high population density to protect harvest.

Paper package 125 000
250 000



Plastic bucket 125 000
250 000



Tubus 10 000
25 000
50 000



Jar 250
500



Bottle 500



Tubus MAC FOOD+ 100



SACHET

Sachets are packed in boxes. It is improved spreading system that will allow non-stop and consistent spreading of beneficials during several weeks.

Double paper sachet 125 000
250 000



Paper sachet with a hook 125 000



Foil sachet with a hook 125 000



BENEFICIAL INSECTS IN SACHETS



Depending on nutrient supplements and food base there are three systems of foiled sachets:

FAST

Working period – 3 weeks.

Peak release of mites from a sachet - the first week, and sharp decrease at the end of the 3rd week. Used on photoculture and pollen crops.

STANDART

Working period – 4 weeks.

Peak release of mites from sachets - the second week, and sharp decrease at the end of the 4th week.

LONG

Working period – 6 weeks.

Gradual and increasing release of mites imago from sachets during 6 weeks. Acceptable for crops without pollen, and low level contamination.

BENEFICIAL INSECTS RELEASE TABLE

Week	FAST	STANDART	LONG
	Quantity of beneficials		
1	300	200	150
2	250	250	200
3	150	250	250
4		150	250
5		50	150
6			100
Total	700	900	1100



Foiled high - tech sachets with different working period.



Double sachets are an effective solution for crops with active top irrigation.

Water flows down the outer surface of the sachet, while the inner surface and the openings for the exit of predators remain dry. This design of the sachet protects the contents from getting wet and rotting.

It is convenient to hang double sachets on crops with horizontal branches or wires, since the sachets are counterweights to each other.

The water-resistant design ensures the longest possible operation of the sachets and the daily release of predatory mites.



ADVANTAGES OF THE SACHETS

- Convenient and easy usage.
- Plant leaves are clean, without bran.
- The sachets act as a tracker.
- Even distribution of predators.
- Daily cumulative increase in the population of entomophages, without pests.
- Predators in sachets are protected from treatments, dry air, sunlight, infections.
- The sachets can be redistributed over the area during the period of work.

BENEFICIAL INSECTS



HYPOASPIS MILES



Hypoaspis miles is a soil-dwelling predatory mite, an aggressive predator of small invertebrates living in the substrate. It is believed that adults live for several months in the presence of food and up to 70 days in its absence, surviving on the food eaten earlier.

This ability allows him to restrain the development of the pest population at a minimum level.

CONTROL



Western flower thrips
(*Frankliniella occidentalis*)



Mushroom mosquito
(*Sciaridae*)



Shore fly
(*Scatella tenuicosta*)



Collembola

PACKAGE

Package type	Capacity	Quantity of mites
 Plastic bucket	5 liters	125 000

ADVANTAGES

- It has established itself as a universal predator against soil pests.
- It has a rather long life period compared to other predatory mites.
- Application rate of 50 -100 mites per 1 m² is used for prevention, and application rate up to 300 mites per 1 m² is used when the level of damage is very high.



APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	50 mites/m ²	50 mites/m ²	200 mites/m ²	300 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

TRANSEIUS MONTDORENSIS



Transeius montdorensis starts to hunt actively at the temperature higher than 14 °C. It has higher controlling effect against thrips and whitefly in regions with cold nights. In compare with *Amblyseius Swirskii*, *Montdorensis* prefers 1 and 2 - instar thrips larvae.

At the optimal temperature it can eat up to 10 thrips larvae daily and can destroy up to 20 whitefly eggs or up to 15 whitefly larvae.

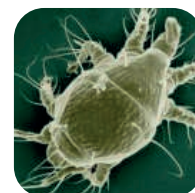
CONTROL



Greenhouse whitefly
(*Trialeurodes vaporariorum*)



Tabacco whitefly
(*Bemisia tabaci*)



Tarsonemide mites
(*Tarsonemidae*)



Western flower thrips
(*Frankliniella occidentalis*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	10 000, 25 000, 50 000
 Paper bag	5 liters	125 000, 250 000
 Plastic bucket	5 liters	125 000
 Paper sachets	500 sachets x 500	250 000
 Foiled sachets	1000 sachets x 125	125 000

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	0,5 sachets/m ²	0,5 sachets/m ²	–	–
Loose material	–	50 mites/m ²	100 mites/m ²	–
Loose material	–	–	100 mites/m ²	150 mites/m ²
Application periodicity	Once per month	Once per two week	Every week	Every week

TYPHLODROMIPS (AMBLYSEIUS) SWIRSKII



Female of *Amblyseius swirskii* can eat 15-20 eggs or 10-15 young larvae of whitefly daily. For the mite population to grow rapidly it is necessary that thrips and whitefly are present on plants simultaneously. It adapts to summer temperature, does not fall into diapause, eats pollen.

Amblyseius swirskii is widely used in thrips and whitefly control prevention strategies in greenhouse conditions.

CONTROL



Greenhouse whitefly
(*Trialeurodes vaporariorum*)



Tobacco whitefly
(*Bemisia tabaci*)



Tobacco thrips
(*Thrips tabaci*)



Western flower thrips
(*Frankliniella occidentalis*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	25 000, 50 000
 Paper bag	5 liters	125 000, 250 000
 Plastic bucket	5 liters	125 000
 Paper sachet	500 sachets x 250, 1000 sachets x 250	125 000, 250 000
 Paper sachet with hook	500 sachets x 250, 1000 sachets x 125	125 000
 Foiled sachets	500 sachets x 250, 1000 sachets x 125	125 000

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	0,5 sachets/m ²	0,5 sachets/m ²	–	–
Loose material	–	50 mites/m ²	100 mites/m ²	–
Loose material	–	–	100 mites/m ²	150 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

NEOSEIULUS CALIFORNICUS



Neoseiulus californicus is an universal acariphage. It eats up to 30 eggs of a spider mite. Thanks to pollen it can survive even without eating of pests.

It is active in wide range of temperatures and can live at low air humidity. It is widely used to control mites - phytophages on many vegetable, fruit and berry, decorated cultures in greenhouses and on the open soil.

CONTROL



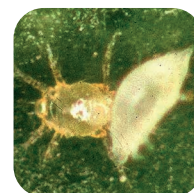
Spider mites
(*Tetranychus urticae/cinnabarinus*)



Strawberry mites
(*Phytonemus pallidus*)



Apple/Citrus mites
(*Panonychus ulmi/citri*)



Greenhouse mites
(*Polyphagotarsonemus latus*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	25 000, 50 000
 Plastic bucket	5 liters	125 000
 Paper sachets with hook	500 sachets x 250, 1000 sachets x 125	125 000
 Paper sachets	500 sachets x 250	125 000

APPLICATION RATE RECOMMENDATIONS

Package type	Профілактика	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	0,05 sachets/m ²	0,5 sachets/m ²	1 sachet/plant	2-3 sachet/plant
Loose material	10 mites/m ²	20 mites/m ²	50 mites/m ²	–
Loose material	–	–	50 mites/m ²	100 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

NEOSEIULUS LONGISPINOSUS

Neoseiulus longispinosus is a specific acariphage, a prominent representative of the beneficial mites of South-East Asia that live in extreme hygrothermal conditions. If humidity is low and temperature is high it is more effective than phytoseiulus.

It inhabits perennials (fruit trees, roses, strawberries) and annuals (vegetables, technical and ornamental crops) plants.

CONTROL



Spider mites
(*Tetranychus urticae*)



Grape spider mite
(*Schizotetranychus viticola*)



Apple/Citrus mite
(*Panonychus ulmi/citri*)



Carmine mite
(*Tetranychus cinnabarinus*)

PACKAGE

Package type		Capacity	Quantity of mites
	Tubus	1 liter	10 000
	Plastic bottle	250 ml	2 000

ADVANTAGES

- In terms of demographic indicators, it exceeds many types of phytoseiids.
- An ideal predator against spider mites, adapted to living in dense webs of mites.
- Ideal for working in greenhouses with high temperatures in summer.
- Suitable for outdoor use on tomatoes, cucumbers, soybeans and in gardens.

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	10 mites/m ²	20 mites/m ²	50 mites/m ²	200 mites/m ²
Application periodicity	Once per month	Once per two week	Every week	Every week

NEOSEIULUS STOLIDUS



Neoseiulus stolidus – a species of predatory mites distributed throughout the world. It is adaptable to a variety of climatic conditions. It inhabits many types of plants.

One of the best predators against echinotrips and other thrips. To maintain its numbers, it uses pollen and eggs of spider mites as additional food.

CONTROL



Echinothrips
(*Echinothrips americanus*)



Tobacco thrips
(*Thrips tabaci*)



Western flower thrips
(*Frankliniella occidentalis*)



Palm thrips
(*Thrips palmi*)

PACKAGE

Package type	Capacity	Quantity of mites
 Paper bag	5 liters	25 000, 50 000

ADVANTAGES

- Plastic to temperature extremes.
- Withstands low temperatures - the lower thermal threshold of development is 9 °C.
- Polyphagous and voracious - an ideal predator against many types of harmful mites and thrips.
- Best suited for pest control in hard-to-reach places on leaves and flowers.
- Good female fertility.
- Rapid population growth.

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	100 mites/m ²	75 mites/m ²	200 mites/m ²	300 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

NEOSEIULUS CUCUMERIS

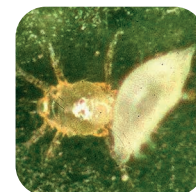
Neoseiulus cucumeris is very mobile. It eats strawberry mites and 1 - instar larvae of thrips. It can eat pollen and thus its application on strawberry, eggplant, pepper, rose, pot plants is very effective.

The entomophage's colonization starts from hanging of sachets on every 5th plant. Loose material is used in the most infected areas if the amount of pests grows.

CONTROL



Strawberry mite
(*Phytonemus pallidus*)



Greenhouse mite
(*Polyphagotarsonemus latus*)



Tobacco thrips
(*Thrips tabaci*)



Western Flower thrips
(*Frankliniella occidentalis*)

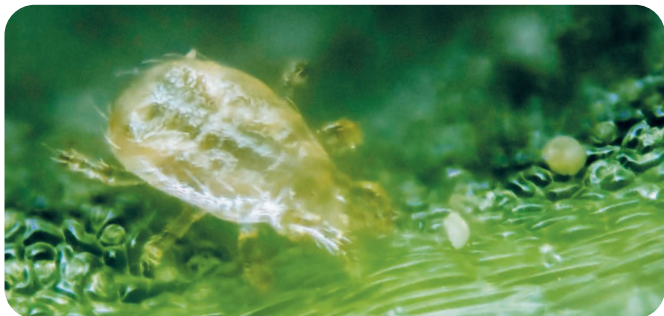
PACKAGE

Package type		Capacity	Quantity of mites
	Tubus	1 liter	50 000
	Paper bag	5 liters	125 000, 250 000
	Plastic bucket	5 liters	125 000, 250 000
	Paper sachet	500 sachets	125 000, 250 000

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	0,5 sachets/m ²	0,5 sachets/m ²	1 sachets/m ²	–
Loose material	–	100 mites/m ²	200 mites/m ²	–
Loose material	–	–	200 mites/m ²	400 mites/m ²
Application periodicity	Once per month	Once per two week	Every week	Every week

NEOSEIULUS AGRESTIS



The parthenogenetic species *Neoseiulus agrestis* is a representative of the temperate climate of central Europe. In nature, it is predominantly found in the soil litter and on low-growing plants. Reproduction occurs by parthenogenesis according to the type of thelytoky – virgin females lay eggs, from which only females develop.

Daily egg production reaches a maximum on the 12 th day and is 2.5 eggs per female. The population of females provides a rapid increase in the number of predators.

CONTROL



Western flower thrips
(*Frankliniella occidentalis*)



Greenhouse whitefly
(*Trialeurodes vaporariorum*)



Spider mites
(*Tetranychus urticae/cinnabarinus*)



Strawberry mites
(*Phytonemus pallidus*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	50 000
 Paper bag	5 liters	125 000
 Plastic bucket	5 liters	125 000
 Paper sachets	500 sachets x 500	250 000
 Fioled sachets with hook	1000 sachets x 125	125 000

ADVANTAGES

- It has the longest oviposition period.
- Relatively it is more prolific than most other species.
- Voracity for the period of oviposition is up to 170 deutonymphs of the spider mite and up to 45 strawberry mite females.

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	100 mites/m ²	100 mites/m ²	200 mites/m ²	300 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

AMBLYSEIUS HERBARIUS

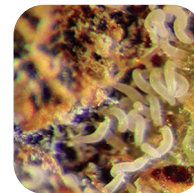
Amblyseius herbarius – a parthenogenetic species from the temperate zone. Asexual reproduction occurs by parthenogenesis according to the thelytoky type - virgin females lay eggs, of which only females develop. Population of females ensures rapid growth the number of predators.

Under natural conditions, it lives on grassy plants and shrubs. This type is pronounced polyphage. It feeds on a wide variety of pests.

CONTROL



Multi-claw mites
(*Tarsonemidae*)



Four-leg mites
(*Eriophyidae*)



Spider mites
(*Tetranychidae*)



Thrips
(*Thripidae*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	50 000
 Paper bag	5 liters	125 000
 Plastic bucket	5 liters	125 000

ADVANTAGES

- Active, begins to breed at an air temperature of 13 °C.
- Rapid population growth.
- Able to eat thrips larvae and eggs, whitefly larvae.
- Works well with other bioagents.

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	100 mites/m ²	50 mites/m ²	100 mites/m ²	200 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

NEOSEIULUS REDUCTUS



Neoseiulus reductus is distributed in the natural conditions of Eurasia. It lives on herbaceous plants, as well as on shrubs and small trees. An effective agent for the protection of garden strawberries from pests.

Possesses optimum voracity. The female is able to lay 30-40 eggs within 2 weeks with sufficient nutrition. A predator is released during the budding period or after the end of return frosts.

CONTROL



Tobacco thrips
(*Thrips tabaci*)



Strawberry whitefly
(*Aleurodes fragariae*)



Spider mites
(*Tetranychus urticae/cinnabarinus*)



Strawberry mites
(*Phytonemus pallidus*)

PACKAGE

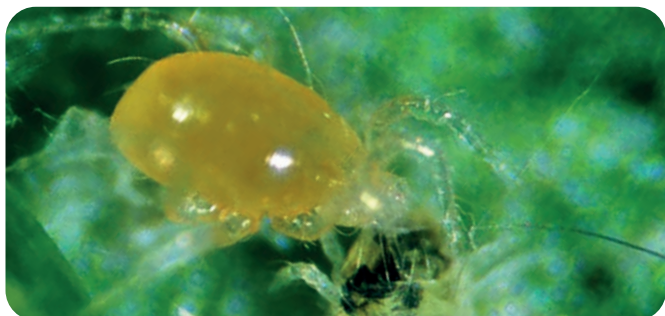
Package type	Capacity	Quantity of mites
 Paper bag	5 liters	125 000
 Paper sachets	500 sachets x 500	250 000
 Foiled sachets with hook	1000 sachets x 125	125 000

ADVANTAGES

- The life expectancy of a predator is up to 38 days.
- The temperature range for normal development is 12-32 °C, air humidity is over 70% and the light period lasts 14-16 hours.
- Under optimal hygrothermal conditions, the duration of development of one generation (from egg to egg) is 7-8 days.
- Females of *Neoseiulus reductus* are able to eat up to 5 females of the spider mite on average during the day, and for the entire period of reproduction they destroy up to 50 females of this pest.

APPLICATION RATE RECOMMENDATIONS

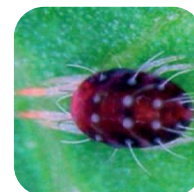
Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	1 sachets/m ²	1 sachets/m ²	–	–
Loose material	–	50 mites/m ²	100 mites/m ²	200 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

AMBLYSEIUS ANDERSONI

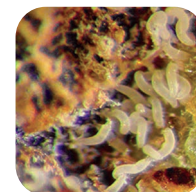
The circle of victims of *Amblyseius andersoni* includes various species of herbivorous mites which are harmful for fruit and berry crops. Adults predators attack all stages of mites. Predators nymphs prefer to eat eggs, can prey on mites in their younger stages of development.

Its predation activity against spider mites is 5 individuals or 15-20 eggs per day.

CONTROL



Red apple mite
(*Panonychus ulmi/citri*)



Grape spider mite
(*Colomerus vitis*)



Garden spider mite
(*Schizotetranychus pruni*)



Grape mite
(*Schizotetranychus viticola*)

PACKAGE

Package type	Capacity	Quantity of mites
 Tubus	1 liter	25 000, 50 000
 Paper bag	5 liters	125 000, 250 000
 Plastic bucket	5 liters	125 000
 Paper sachet with hook	500 sachets x 500, 1000 sachets x 125	125 000

APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Sachets	1 sachet/m ²	1 sachet/m ²	–	–
Loose material	–	50 mites/m ²	100 mites/m ²	–
Loose material	–	–	100 mites/m ²	150 mites/m ²
Application periodicity	Once per month	Once per two weeks	Every week	Every week

APHIDIUS COLEMANI



The wasp *Aphidius colemani* is a solitary endoparasitoid of small aphid species: cotton aphid (*Aphis gossypii*), peach aphid (*Myzus persicae*) and tobacco aphid (*Myzus nicotianae*). Aphidiid females tend to lay their eggs in aphids that are not infected by other riders.

During the life cycle, the female lays about 100 eggs. The life span of adults is 2-3 weeks. The ratio of females and males is 2:1.

CONTROL



Melon aphid
(*Aphis gossypii*)



Pear aphid
(*Myzus persicae*)



Tobacco aphids
(*Myzus nicotianae*)



Bird cherry aphid
(*Rhopalosiphum padi*)

PACKAGE

Package type	Capacity	Quantity of mites
 Bottle	30 ml	500

ADVANTAGES

- It is the best predator for controlling aphids.
- During its life it can parasitize more than 300 aphids (within 3 weeks).
- It has the ability to search for new aphid colonies.
- Ideal for preventive controlling of green peach, cotton, tobacco and related aphids.



APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	0,25 mites/m ²	1-2 mites/m ²	3 mites/m ²	-
Application periodicity	Once per month	Once per two weeks	Every week	Every week

ADALIA BIPUNCTATA

Adults and larvae feed on all types of aphids, spider mites, thrips. Adult ladybugs fly and find aphid nests. Females lay 20 to 50 eggs daily.

Ladybug larvae are a core control tool, they stay and work where you apply them. The optimal starting temperature is +15°C, and only if pests are present. Scatter predators in the morning or evening.

CONTROL



Melon aphid
(*Aphis gossypii*)



Pearch aphid
(*Myzus persicae*)



Black bean aphid
(*Aphis fabae*)



Potato aphid
(*Aulacorthum solani*)

PACKAGE

Package type	Capacity	Quantity of mites
 Plastic bottle	250 ml	100 (imago)
 Plastic bottle	250 ml	100 (larva)

ADVANTAGES

- Feeds on all types of aphids.
- Imago flies and lays eggs in aphid cells.
- Gluttonous, the cell is destroyed in a week.
- Easy to track performance.



APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rates depending on the stage of damage		
		Low stage	Middle stage	High stage
Loose material	–	10 mites/m ²	25 mites/m ²	50 mites/m ²
Application periodicity	–	Evict three times from the moment of appearance of pest cells, with an interval of 7-10 days		

BENEFICIAL INSECTS

ATHETA CORIARIA



Atheta coriaria is a ground-dwelling flying predator that aggressively hunts small invertebrates living in the substrate. Adults are actively spreading over the territory. The total development time of the generation takes from 10 to 22 days.

It is used to control fungus gnats, thrips pupae, shore flies, butterfly larvae, root mealybugs, mealybugs and other small arthropods.

CONTROL



Western Flower thrips
(*Frankliniella occidentalis*)



Dark-winged Fungus Gnats
(*Sciaridae*)



Root Mealybug
(*Rhizococcus* spp)



Grapevine phylloxera
(*Dactylosphaera vitifoliae*)

PACKAGE

Package type	Capacity	Quantity of mites
 Plastic bucket	5 liters	3 000

ADVANTAGES

- Works in substrate and soil.
- Destroys the nymphal stages of thrips.
- High search ability.
- Adults and larvae are active predators.
- Capable of killing more than it eats.
- A large predator, it is easy to track its activity.



APPLICATION RATE RECOMMENDATIONS

Package type	Prevention	Application rate depending on the damage stage		
		Low stage	Middle stage	High stage
Loose material	1 mites/m ²	5 mites/m ²	10 mites/m ²	–
Quantity of applications	1-2 times	2-3 times	3-4 times	–

STEINERNEMA FELTIAE



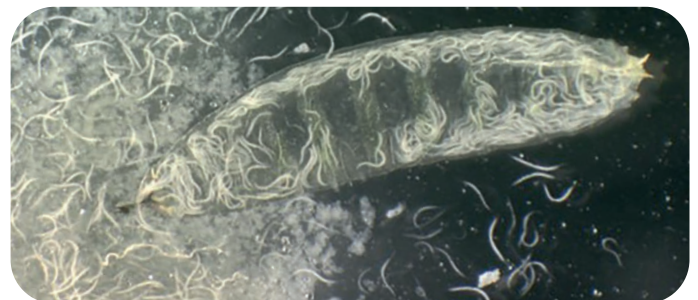
STEINERNEMA CARPOCAPSAE



PESTS

Tuta absolute, thrips, cucumber mosquito, mower (elephant), bear, May beetle, apple codling, different types of scoops, diabrotics, wireworms.

May beetle, bed bugs (nesidiocoris, marble bug), mole cricket, different types of scoops, goldfish, sam-shit moth, Colorado potato beetle, click beetles, codling beetles.



KEY CROPS

Greenhouse vegetables and decorative flower crops, open ground vegetable crops, garden strawberries, currants. On a peat substrate, it is recommended for use on cranberries and blueberries.

FEATURES OF THE APPLICATION OF NEMATODE

- Against sciarid flies, the product consumption rate is 0.5 - 1 million per 1 m².
- Against Western flower thrips on rose for leaf treatment 5 billion per 1 ha.
- Application rates vary depending on the amount of the pest and the method of application.
- The average consumption rate of the product in the fight against phytophages for preventive purposes is 0.5 million, with an average and high pest density of 1-2 million per 1 m².

WET TREATMENTS WITH NEMATODE ON PLANTS

- The dosage depends on the leaf area index and the number of pests on the leaves.
- Use 1250 to 2000 liters of water per hectare.
- Repeat treatments every week until the problem is solved.

THE BEST CONDITIONS FOR WORKING NEMATODE

- Wet soil or substrate.
- Soil temperature in the range of 10 to 30 °C.
- UV protection (nematodes are killed by ultraviolet rays and drying).

BENEFICIAL INSECTS

MACROLOPHUS PYGMAEUS



Macrolophus pygmaeus is a predatory bug that feeds on whiteflies, aphids, mites, eggs and caterpillars of Lepidoptera, all kinds of thrips, larvae of leaf miner flies.

The most active are nymphs of 4–5 age periods. During the day, one individual destroys about 30 young whitefly larvae or up to 40 aphids. Imago are less gluttonous.

CONTROL



Greenhouse whitefly
(*Trialeurodes vaporariorum*)



Tuta absoluta
(*Tuta absoluta*)



Western-flower thrips
(*Frankliniella occidentalis*)



Cotton cutworm
(*Helicoverpa armigera*)

PACKAGE

Package type	Capacity	Quantity of mites
 Plastic bottle	250 ml	250, 500

ADVANTAGES

- Provides comprehensive pest control in nightshade crops.
- It is fixed on plants for the entire growing season (the entire turnover).
- Large, easy to visually monitor.



APPLICATION RATE RECOMMENDATIONS

Type of culture	Prevention	Application rate depending on the damage stage		
		Low stage	Middle stage	High stage
Light-culture	3 bugs/m ²	3 bugs/m ²	5 bugs/m ²	10 bugs/m ²
Without light	2 bugs/m ²	2 bugs/m ²	3 bugs/m ²	5 bugs/m ²
Application periodicity	1-2 times	3 times	4-6 times	5-10 times

It is important to use within 18 hours after delivery!

FOOD FOR PREDATORY BUGS MAC FOOD+



BIO PROTECTION has developed a specialized nutritious MAC FOOD+ feed for feeding the predatory bug *Macrolophus pygmaeus*, which directly affects the lifespan and fertility of the predator.

By using feed, you ensure the rapid growth and health of the *Macrolophus pygmaeus* population, which is necessary for effective pest control in the crop.

USAGE AND ADVANTAGES

Specialized food MAC FOOD + is available in 100 g packaging:

- Simple and convenient packaging.
- The dispenser lid allows you to evenly distribute the feed throughout the crop.
- The feed contributes to the growth of fertility, accelerates the development of generations.
- Increases the lifespan of entomophages. Increases the activity of entomophages at elevated and low temperatures.
- Expands the preferred diet.

It is used as a top dressing for the predatory bug *Macrolophus pygmaeus* at the stage of application and to maintain the population in the culture.

CONTENT

Sitotroga, *Ephestia*, *Artemia*, vitamin premix, pollen.



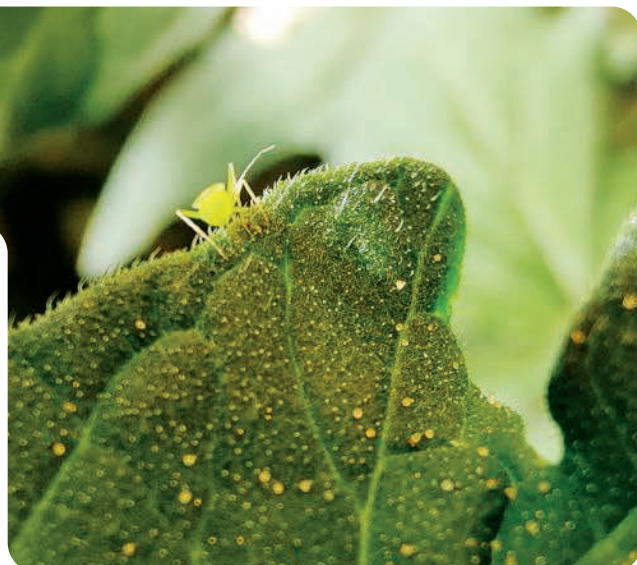
THE WAY HOW MAC FOOD+ INFLUENCES THE DEVELOPMENT OF PREDATORY BUGS

The MAC FOOD+ multi-ingredient feed has a high energy value, which remains available for predators for a long time. The presence of food helps to increase the fertility of females per day by 15%, prolonging their life and increasing the reproductive period by 5-10 days. In general, the use of this feed increases the fertility of the population of predatory bugs by 30%-50%, depending on the chemical background, culture and cultivation technology.

At the same time, this mixture remains less attractive to the bug compared to the larvae of whiteflies, eggs of tuta absolute and other Lepidoptera.



TO PURCHASE THE PRODUCT AND MORE
DETAILED INFORMATION, GO TO THE BIO-GROUP.NET SITE



TRICHOGRAMMA BRASSICAE



Trichogramma brassicae is a species of parasitoid egg-eating wasps whose females infest freshly laid eggs of the pest host with their offspring. The female lays up to 50-80 eggs, the average life span of adults is up to 7 days. In the presence of nectar, the life span increases to 15 days. The optimum temperature for development and reproduction is 18-30 °C, relative air humidity 60-95%. Under drier conditions, the life span of insects is reduced.

CONTROL



Corn moth
(*Ostrinia nubilalis*)



Cotton cutworm
(*Helicoverpa armigera*)



Cabbage worm
(*Pieris brassicae*)



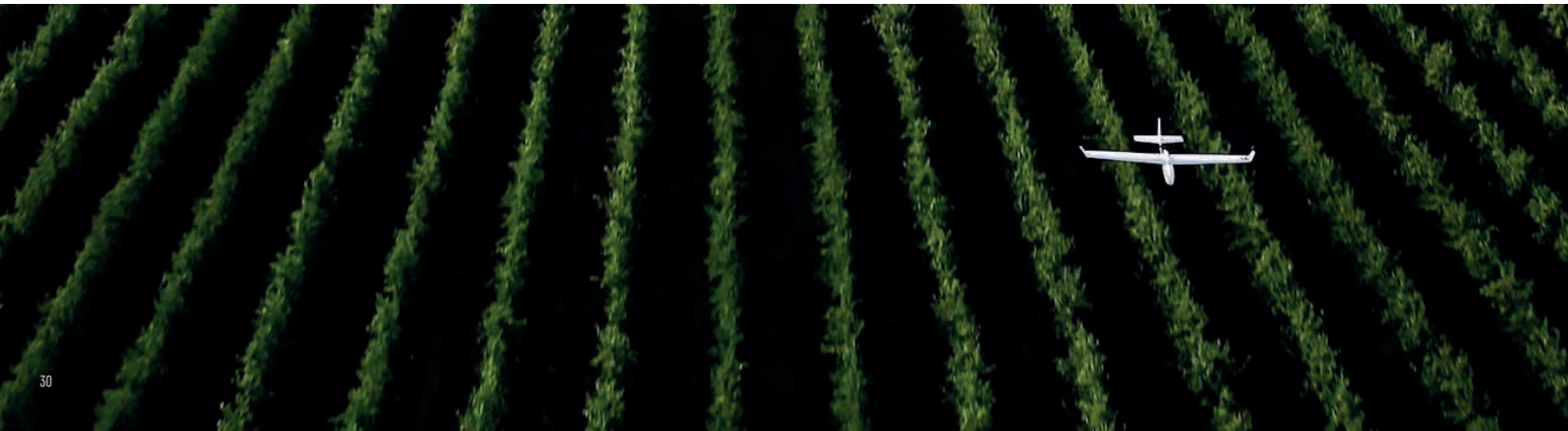
Grey tomato worm
(*Keiferia lycopersicella*)

PACKAGE

Package type		Capacity	Quantity of eggs
	Envelope	10 g	1 000 000 pc
	Envelope	30 g	3 000 000 pc
	Envelope	50 g	5 000 000 pc

APPLICATION RATE RECOMMENDATIONS

The application rate of *Trichogramma* is from 1 to 3 grams per hectare (100-300 thousand individuals).
The number of applications is from two to five per season.
For dachas and gardens – 20,000 individuals (0.25 grams) are released per 1 large tree.



DRONES



- A modern way of trichograms application using a UAV, which is suitable for various crops and any complexity of fields.
- Drones and planes are controlled by an autopilot using a GPS program, the route is built based on the terrain and contours of the fields.
- One drone spreads Trichogramma on 150 hectares per flight, and almost 1,000 hectares per day.

FACTORS FOR SUCCESSFUL USAGE OF TRICHOGRAM

1. 70% of success depends on the uniformity, simultaneous and timely application.
2. The choice of the manufacturer of the trichogram and the method of its application in advance.
3. Using a pheromone trap monitoring system.
4. Accounting for weather conditions and adjusting the time of application.
5. Choosing the right type of Trichogramma depending on your pests.
6. Use of high quality biomaterial.
7. Pest early summer tracking (oviposition).
8. Carrying out repeated fixing applications in 7-10 days.
9. Application in its pure form without fillers.
10. Use of specialized entomological drones.
11. Compliance with flight mission requirements depending on the entomophage.
12. Carrying out monitoring of pests and entomophages.
13. Use only compatible pesticides.

UAV OPTIONS FOR INTRODUCING ENTOMOPHAGES

	<i>Trichogramma spp</i>	<i>Atheta coriaria</i>	<i>Adalia bipunctata</i>	<i>Chrysoperla carnea</i>	<i>Habrobracon hebetor</i>	<i>Neoseiulus cucumeris</i>	<i>Neoseiulus longispinosus</i>	<i>Hypoaspis miles</i>	<i>Neoseiulus reductus</i>	<i>Amblyseius andersoni</i>	<i>Neoseiulus reductus</i>	<i>Aphidius colemani</i>	<i>Steinernema feltiae</i>	<i>Steinernema carpocapsae</i>
+++	Good fixation and breeding													
++	Poor fixation													
+	Not fixation on the Crop													
-	Not recommended													
UAV														
Spraying drone	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Entomological drone	+++	+++	++	+++	+++	++	++	+++	++	++	+	-	-	-
Wing	+++	-	-	-	-	-	-	-	-	-	-	-	-	-





ADVANTAGES OF USAGE BUMBLEBEES FOR POLLINATION

- Stable and high-quality pollination.
- Increasing the number of fruits, their weight and quality.
- Reducing the percentage of non-standard products.
- Improving taste characteristics.
- Increasing the quantity and quality of the crop provides additional profit.
- Environmentally friendly products.
- Strengthening plant immunity

PACKAGE ADVANTAGES

- The transformer cover provides 2 modes of ventilation.
- Ventilation openings provide 50% more fresh air.
- Thick cardboard with a water-repellent coating protects against water.
- The stabilized syrup provides long-term work for the family.
- The letok supports the B-control system.

BUMBLEBEES ADVANTAGES

- High activity: visit 10-12 flowers/min.
- They do not have selectivity in the choice of flowers.
- They work in cloudy weather and at temperatures from +8 °C.
- They navigate well at dusk.
- They create special vibrations that allow you to pollinate tomato flowers.

USAGE RECOMMENDATIONS FOR CROPS

Tomato	4-6 hives/hectar
Pepper	3-4 hives/hectar
Eggplant	4-5 hives/hectar
Watermelon, melon, pumpkin	5-6 hives/hectar
Strawberry, raspberry, blueberry	6-8 hives/hectar
Apple, pear, sweet cherry, cherry	7-9 hives/hectar
Sunflower, clover, flax	9-10 hives/hectar

Bumblebees actively work for 6-8 weeks in the fields and gardens, in greenhouses for 8-12 weeks. The pollination control system B-control determines the activity of the bumblebee family and promptly recommends replacing it in case of a decrease in activity.

Thanks to this, pollination is always on top.

FEATURES OF APPLICATION

- Place hives no closer than 7 m from the entrance.
- Install hives at a height of 1 m from the floor.
- Protect hives from overheating and condensation.
- Place hives away from CO₂ supply points.



Videos, reviews, and training
on our YouTube channel



B-CONTROL POLLINATION CONTROL IN GREENHOUSES

AGROLABS B-Control equipment is a bee hive manager that collects bumblebee activity data and helps you monitor pollination efficiency remotely.



ADVANTAGES OF USAGE B-CONTROL

- Online management of all hives at once or each separately.
- Monitoring the current activity of bumblebees.
- The ability to timely replace weak or diseased hives.
- Reduced labor costs for manual opening and closing of hives (important in light culture).
- Determination of the dynamics of bumblebee activity depending on climate and treatments.
- Increased yield by 10% due to high-quality pollination.
- Collection and analysis of data.



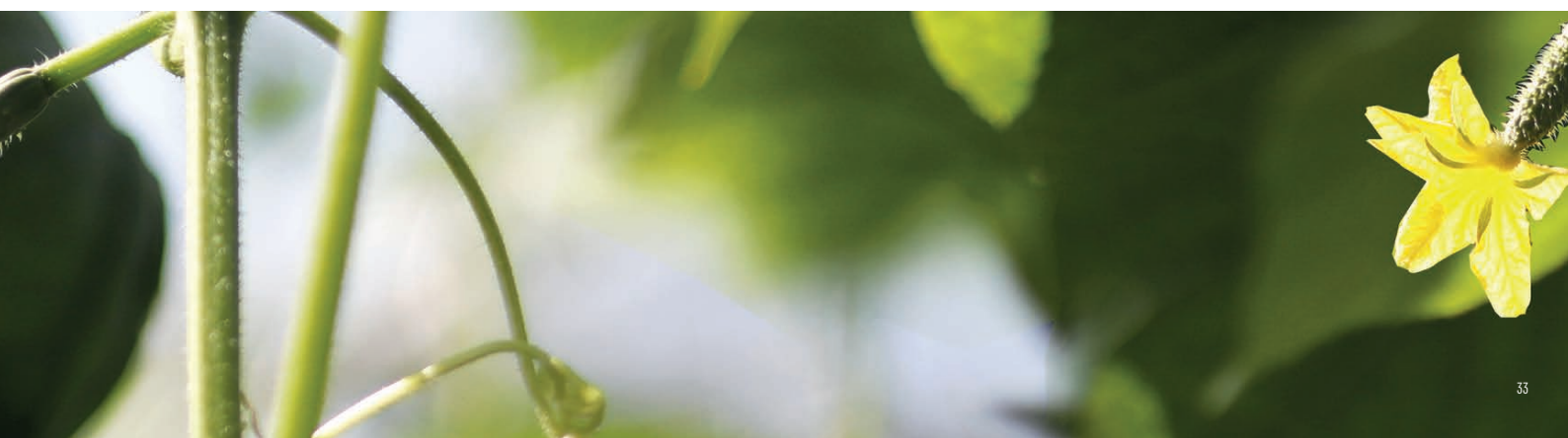
Wireless sensor will provide up to 10 weeks of operation



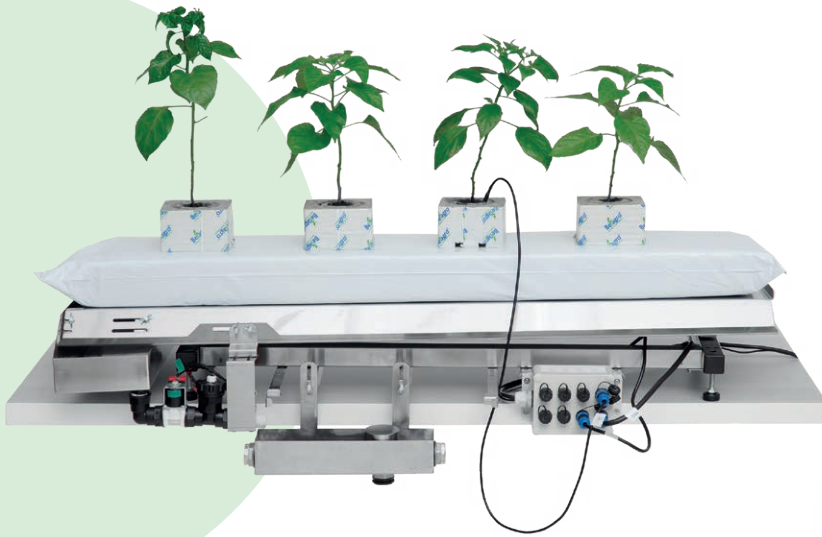
Standard batteries that are easy to replace and charge



The sensor is not removed from the hive. Battery replacement takes place on site



W-SENS EQUIPMENT



The AGROLABS W-Sens substrate condition monitor helps you achieve optimal watering levels and nutrient delivery.

Sensors collect moisture levels, percent drainage, EC and pH of substrate and drainage, temperature and weight. All information can be viewed online in the BioController software.

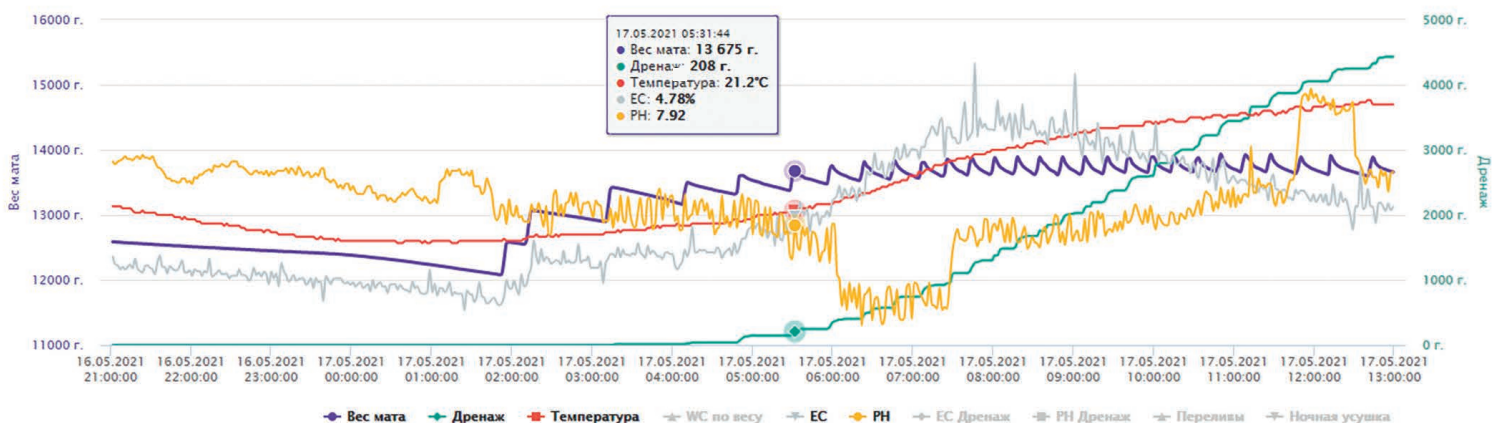
ELEMENTS

- Power structure.
- On-board computer with power supply.
- pH and EC level sensors.
- Temperature sensors.
- Soil moisture digital sensor.
- Analog load cell scales.
- Drainage control system with two solenoid valves.



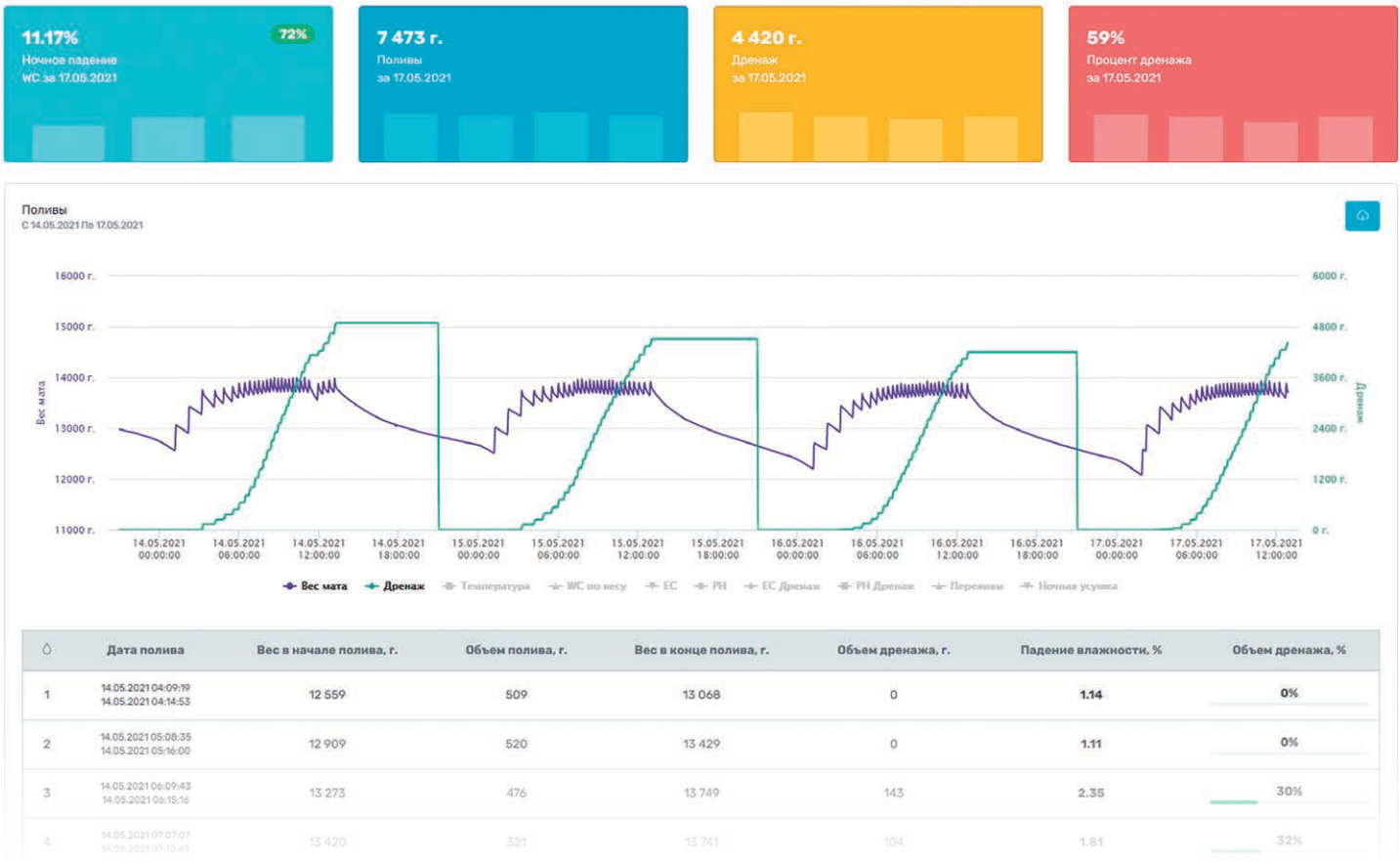
SUBSTRATE DYNAMICS IN REAL TIME

Maintain optimal water balance for a good start and full plant development using intelligent control of weight, moisture, EC, pH and substrate temperature.



IRRIGATION REPORT

Analyze your irrigation strategy and adjust it using convenient dashboards.



USAGE ADVANTAGES OF W-SENS

- Information in one software.
- Integration with the BioController software.
- Saving water and fertilizers for irrigation.
- Substrate parameters control through online drainage monitoring.
- Management of the composition of irrigation water and the plant nutrition system.
- Increase in plant productivity, selection of the best types of substrate.



Scan code
for details



PESTS



PROTECTION STAGES (IPM)

TUTA ABSOLUTA

I MECHANICAL PROTECTION

- Close the soil with a film, window vents with
- nets. Put electric traps - 1 piece / 2 weaves.
- Remove mines while monitoring.
- Seal plant residues.
- Hang black glue roll traps.
- Distribute the pheromones over the area.

II BENEFICIAL INSECTS

The first application of predatory bugs is carried out in the seedling section for 20% of seedlings, at the rate of 250 pieces for 40-50 plants. The population of *Macrolophus* 15-30 bugs per plant is able to control the main list of pests of nightshade crops. Pheromones are used for monitoring, trapping and disorientation. Entomopathogenic nematodes work against pupae in the soil. *Trichogramma* parasitizes on eggs. *Tutavir* destroys caterpillars and infects the entire population, making it susceptible to chemistry.



Object	Latin name	Prevention	Application rate depending on the damage stage		
			Low stage	Middle stage	High stage
	<i>Trapline zentinel 45</i>	4 pc/1 ha/45 days	40 pc/1 ha/30 days	-	-
	<i>Izonet</i>	1000 pc/1 ha/120-150 days	-	-	-
	<i>Tutavir</i>	100 ml/1 ha/ 5-10 days	200 ml/1 ha/ 5-10 days	300 ml/1 ha/ 5-10 days	-
	<i>Steinernema feltiae</i>	50 mln/1000 m ²	125-250 mln/1000 m ² once per month		500 mln/1000 m ²
	<i>Trichogramma achaeae</i>	100 block/1 ha/2 weeks	200 block/1 ha/1week	300 block/1 ha/1 week	400 block/1 ha/1 week
	<i>Macrolophus pygmaeus</i> Light culture Without light	3 pc/m ² 2 pc/m ²	3 pc/m ² 2 pc/m ²	5 pc/m ² 3 pc/m ²	10 pc/m ² 5 pc/m ²
Applications periodicity		1-2 applications	3 applications	4-6 applications	5-10 applications

III PESTICIDES FOR IPM

Nerves/muscles

Grow/development

Breathe

Stomach

Uncertain

action mode classification **IRAC**

IRAC	Action mode	Active matter	Dosage per 100 l
UNF	Entomopathogenic fungi of uncertain mode of action	metarhizium anisopliae P-72	8-25 l/ha
UN	Compounds of natural origin, uncertain mode of action	azadirachtine 26 g/l	150 ml
11	Bacterial insecticides	bacillus thurengiensis aizawai 25000 iu/mg	1-2 kg/ha
28	Ryanidine receptor modulators	chlorantraniliprole 200 g/l	20 ml
28	Ryanidine receptor modulators	cyantraniliprole 200 g/l	50 ml
28	Ryanidine receptor modulators	flubendiamide 240 g/kg	25 g
5	Allosteric modulators	spinetoram 120 g/l	50 ml
5	Allosteric modulators	spinosad 480 g/l	30 ml
15	Chitin biosynthesis inhibitors	lufenuron 50 g/l	150 ml
18	Shedding hormone	methoxyfenozide 240 g/l	40 ml

PROTECTION STAGES (IPM)

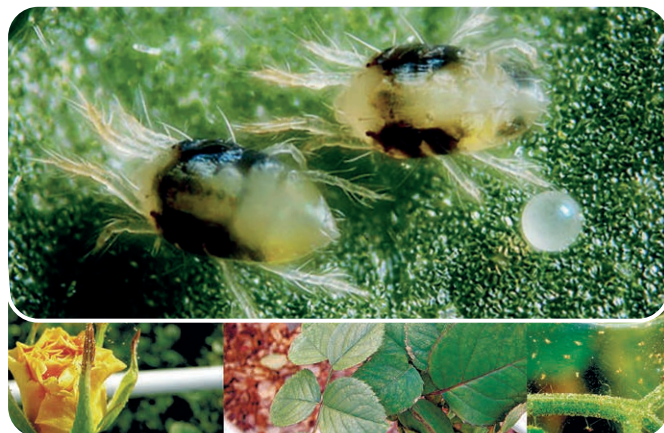
I MECHANICAL PROTECTION

Monitor and remove outbreaks.

Spatially isolate plants from places where mites can be: seal the soil with oilcloth, repair cracks in structures, paint posts, remove weeds, and store plant residues hermetically.

II BENEFICIALS INSECTS

- Entomophages destroy the spider mite - this solves the problem of resistance.
- Use predators already in seedlings when the predator-victim ratio is most effective.
- When the first damaged places appear, doses are increased and the application time is reduced.
- Compatible acaricides can be used with entomophages.
- For elimination, select drugs with a short decay period.
- The minimum chemical background is the key to success for a new turnover.



SPIDER MITES - TETRANYCHIDAE

Bio agent	Latin name	Optimum predator-victim ratio	Prevention	Application rate depending on the damage stage		
				Low stage	Middle stage	High stage
	<i>Neoseiulus californicus</i>	1:5	10 pc/m ² 500 pack/1ha/1week	25 pc/m ² 10 000 pack/1 ha/1 month	50 pc/m ²	100 pc/m ² -
	<i>N. longispinosus</i>	1:10	10 pc/m ²	25 pc/m ²	50 pc/m ²	200 pc/m ²
	<i>Phytoseiulus persimilis</i>	1:15	4 pc/m ²	25 pc/m ²	50 pc/m ²	100 pc/m ²
	<i>N. agrestis</i>	1:10	100 pc/m ²	100 pc/m ²	200 pc/m ²	300 pc/m ²
	<i>Macrolophus pygmaeus</i>	100 imago 1 g feed per week	1 pc/m ²	5 pc/m ²	10 pc/m ²	-
	<i>Chrysoperla carnea</i>	1:50	0,3 pc/m ²	5 pc/m ²	20 pc/m ²	40 pc/m ²
	<i>Feltiella acarisuga</i>	1:50	0,5 pc/m ²	10 pc/m ²	25 pc/m ²	50 pc/m ²
	<i>Amblyseius herbarius</i>	1:10	100 pc/m ²	100 pc/m ²	200 pc/m ²	300 pc/m ²
Application periodicity			Once per month	Once per two weeks	Every week	Every week

III PESTICIDES FOR IPM

Nerves/muscles

Grow/development

Breathe

Stomach

Uncertain

action mode classification **IRAC**

IRAC	Action mode	Active matter	Dosage per 100 l
10A	Mite growth inhibitor	chlofentezin 500 g/l	30 ml
10A	Mite growth inhibitor	hexythiazox 10%	50 g
12B	Mitochondrial ATP synthase inhibitors	fenbutatinoxide 50%	50 g
25A	Electron transport inhibitors in the mitochondrial complex II	cyflumetofen 200 g/l	100 ml
20D-20B	Electron transport inhibitors in the mitochondrial complex III	bifenazate 240 g/l acequinocyl 150 g/l	40-60 ml 100 ml

PROTECTION STAGES (IPM)

THYSANOPTERA

I MECHANICAL PROTECTION

Solarization of empty greenhouses in summer. Close the soil with a film, window vents with nets. Before the appearance of plants, in an empty greenhouse, organize the maximum capture of flying thrips with yellow / blue traps, use food baits and pheromones to enhance capture. Maintain liquidation waiting periods between rotations, ensure the spatial separation of seedlings from the old culture. Eliminate weeds.

II BENEFICIALS INSECTS

- Thrips control is based on a preventive predator release plan.
- It is convenient to protect seedlings with loose material, after closing the first leaves they switch to bags with a hook, in parallel use loose biomaterial in the damaged areas.
- Soil predators and parasites are used according to the protection plan, which is developed individually.



Bio agent	Latin name	Prevention	Application rate depending on the damage stage		
			Low stage	Middle stage	High stage
	<i>Steinernema feltiae</i>	50 mln/1000 m ²	125-250 mln/1000 m ² pnce per month		
	<i>A. cucumeris</i>	50 pc/m ²	100 pc/m ²	250 pc/m ²	500 pc/m ²
	<i>A. swirskii</i>	25 pc/m ²	50 pc/m ²	100 pc/m ²	150 pc/m ²
	<i>Transeius montdorensis</i>	25 pc/m ²	50 pc/m ²	100 pc/m ²	150 pc/m ²
	<i>N. agrestis</i>	100pc/m ²	100 pc/m ²	200 pc/m ²	300 pc/m ²
	<i>Macrolophus pygmaeus</i>	0,25 pc/m ²	0,5 pc/m ²	1 pc/m ²	3 pc/m ²
	<i>Hypoaspis miles</i>	25 pc/m ²	50 pc/m ²	100 pc/m ²	200 pc/m ²
	<i>Atheta coriaria</i>	-	1 pc/m ²	3 pc/m ²	5 pc/m ²
	<i>Orius laevigatus</i>	0,5 pc/m ²	1 pc/m ²	5 pc/m ²	10 pc/m ²
Application periodicity		1 per month	Once per two weeks	Every week	Every week

III PESTICIDES FOR IPM

Nerves/muscles

Grow/development

Breathe

Stomach

Uncertain

action mode classification **IRAC**

IRAC	Action mode	Active matter	Dosage per 100 liters
UNF	Entomopathogenic fungi of uncertain mode of action	paecilomyces fumosoroseus beauveria bassiana	100 g 63 g
UN	Compounds of natural origin, indeterminate mode of action	azadirachtine 26 g/l pyridalyl 100 g/l	150 ml 100-200 ml
28 5	Ryanidine receptor modulators Allosteric modulators	cyantraniliprole 200 g/l spinosad 480 g/l	150 ml 50 ml
15	Mitochondrial ATP synthase inhibitors	lufenuron 50 g/l	50 g

PROTECTION STAGES (IPM)

APHIS

I MECHANICAL PROTECTION

Equip vents with mosquito nets. During the period of active flight of aphids, use gray clothes without yellow. Remove weeds around the greenhouse, as well as plant nectar-bearing plants and lure natural predators and parasitoids. Hang yellow traps at the entrance to the greenhouse. Control the ants in the greenhouse.

II BENEFICIAL INSECTS

Ladybug and other polyphages work on all types of aphids, the main thing is to deliver them on time to the first centers of agroecosis. Specialized parasitoids are selected individually after determining the aphid species.



Bio agent	Latin name	Prevention	Application rate depending on the damage stage		
			Low stage	Middle stage	High stage
Practice on all types of aphids					
	<i>Adalia bipunctata</i>	-	10 pc/m ²	20 pc/m ²	50 pc/m ²
	<i>Aphidoletes aphidimyza</i>	0,4 pc/m ²	1 pc/m ²	5 pc/m ²	>10 pc/m ²
	<i>Chrysoperla carnea</i>	5 pc/m ²	10 pc/m ²	20 pc/m ²	>20 pc/m ²
Beneficial insects with species specialization (see the table on page 41)					
	<i>Aphidius colemani</i>	0,25 pc/m ²	1 pc/m ²	2 pc/m ²	4 pc/m ²
	<i>Aphidius ervi</i>	0,25 pc/m ²	1 pc/m ²	2 pc/m ²	4 pc/m ²
	<i>Aphelinus abdominalis</i>	0,25 pc/m ²	0,5-1 pc/m ²	2-3 pc/m ²	4-5 pc/m ²
Application periodicity		Evict 3-7 times from the moment the cell appears, with an interval of 7-10 days			

III PESTICIDES FOR IPM

Nerves/muscles

Grow/development

Breathe

Stomach

Uncertain

action mode classification **IRAC**

IRAC	Action mode	Action matter	Dosage per 100 l
UNF UNF UNF	Entomopathogenic fungi of uncertain mode of action	paecilomyces fumosoroseus beauveria bassiana verticillium lecanii	100 g 63 g 100 g
UN	Compounds of natural origin, indeterminate mode of action	azadirachtine 26 g/l	150 ml
1 4 9 28 29	Acetylcholinesterase (AChE) inhibitors Competitive modulators of nicotinic receptors acetylcholine (nAChR) Disrupts H ₀ , transient channel Modulators of ryanidine receptors Violates the functions of the chordotonal organs (H ₀)	pirimicarb 50% acetamiprid 20% pymetrozine 50% cyantraniliprole 100 g/l flonicamid 50%	50 g 25 g 20 g 100 ml 15 g

Type of Aphids	Significance	Beneficial insects			Crops
		<i>Aphidius ervi</i>	<i>Aphidius colemani</i>	<i>Aphelinus abdominalis</i>	
<i>Acyrtosiphon pisum</i>		Perfectly			<i>Adalia bipunctata</i> , <i>Aphidoletes aphidimyza</i> , <i>Chrysoperla carnea</i>
<i>Acyrtosiphum kondoi</i>		Good		Yes	
<i>Acyrtosiphum malvae rogersii</i>					
<i>Acyrtosiphum lactucae</i>					
<i>Aphis (frangulae) gossypii</i>			Perfectly		
<i>Aphis craccivora</i>		Yes	Good	Yes	
<i>Aphis fabae</i>			Good		
<i>Aphis forbesi</i>					
<i>Aphis nasturtii</i>					
<i>Aphis pomi</i>					
<i>Aphis spiraeicola</i>			Yes		
<i>Aulacorthum circumflexum</i>				Yes	
<i>Aulacorthum solani</i>		Good		Yes	
<i>Brachycaudus</i> sp.			Yes		
<i>Brevicoryne brassicae</i>			Yes		
<i>Chaetosiphon tertrarhodum</i>					
<i>Chaetosiphon fragaefolii</i>					
<i>Diuraphis noxia</i>		Good	Yes		
<i>Dysaphis pantaginea</i>					
<i>Hyalopterus pruni</i>			Yes		
<i>Lipaphis erysimi</i>				Yes	Ideal predators for mass colonies of all types of aphids
<i>Macrosiphum creeli</i>					
<i>Macrosiphum euphorbiae</i>		Good		Good	
<i>Macrosiphum rosae</i>		Good		Good	
<i>Megoura</i> sp.					
<i>Metalopophium dirhodum</i>		Perfectly		Good	
<i>Microlophium carnosum</i>		Good			
<i>Myzus ascalonicus</i>					
<i>Myzus ornatus</i>		Yes			
<i>Myzus persicae</i>		Good	Perfectly		
<i>Myzus varians</i>					
<i>Nasonovia ribis-nigri</i>					
<i>Pemphigus bursarius</i>					
<i>Pentalonia nigronervosa</i>			Good		
<i>Pterochloroides persicae</i>					
<i>Rhodobium porosum</i>		Good			
<i>Rhopalosiphum padi</i>			Perfectly	Yes	
<i>Schizaphis graminum</i>		Yes	Good	Yes	
<i>Sitobion avenae</i>		Perfectly		Good	
<i>Sitobium fragaria</i>		Yes			
<i>Smynthuroides betae</i>					
<i>Toxoptera aurantii</i>			Good		
<i>Trama troglodytes</i>					
<i>Wahlgreniella nervata</i>			Yes		

PROTECTION STAGES (IPM)

ALEYRODIDAE

I MECHANICAL PROTECTION

Equip the greenhouse with mosquito nets. Hang yellow traps in the nursery and in empty greenhouses - they will catch flying whiteflies that survived the elimination. This will slow down the development of resistance and reduce the risks of infecting plants with viruses. Treatments with surfactants (surfactants) affect the imago, suffocate, damage the wings and prevent mating.

II BENEFICIALS INSECTS

Predatory ticks feed on eggs and vagrants. Parasitoid riders work on larvae. A predatory bug preys on all stages of development.



Bio agent	Latin name	Prevention	Application rate depending on the damage stage		
			Low stage	Middle stage	High stage
	<i>A. swirskii</i>	0,5-1 pack/m ²	50 pc/m ²	100 pc/m ²	150 pc/m ²
	<i>Transeius montdorensis</i>	0,5-1 pack/m ²	50 pc/m ²	100 pc/m ²	150 pc/m ²
	<i>Amblyseius herbarius</i>	100 pc/m ²	100 pc/m ²	200 pc/m ²	300 pc/m ²
	<i>Neoseiulus agrestis</i>	100 pc/m ²	100 pc/m ²	200 pc/m ²	300 pc/m ²
	<i>Encarsia formosa</i>	1,5 pc/m ²	1,5 pc/m ²	15 pc/m ²	30 pc/m ²
	<i>Eretmocerus eremicus</i>	1 pc/m ²	1 pc/m ²	15 pc/m ²	30 pc/m ²
Application periodicity		1 per month	Once per two weeks	Every week	Every week
	<i>Macrolophus</i> Light culture Without light	3 pc/m ² 2 pc/m ²	3 pc/m ² 2 pc/m ²	5 pc/m ²	10 pc/m ²
Application periodicity		1-2 applications	3 applications	4-6 applications	5-10 applications

III PESTICIDES FOR IPM

Nerves/muscles

Grow/development

Breathe

Stomach

Uncertain

action mode classification **IRAC**

IRAC	Action mode	Action matter	Dosage per 100 l
UNF	Entomopathogenic fungi of unknown origin mode of action	paecilomyces fumosoroseus beauveria bassiana verticillium lecanii	100 g 63 g 100 g
23 7 16	Inhibitors of acetyl carboxylase (COA) A hormone that disrupts development Inhibitor of chitin biosynthesis	spiromesifen 240 g/l pyriproxyfen 100 g/l buprofezin 25%	150 ml 25 ml 70 g
28 29 9	Modulators of ryanidine receptors Violates the functions of the chordotonal organs (HO) Disrupts the transient channel	cyantraniliprole 100 g/l flonicamid 50 % pymetrozine 50%	100 ml 30-40 g 60 g

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