

## PRESTOP® biofungicide in integrated pest management

PRESTOP® is a biological fungicide for the control of damping-off and root diseases (*Pythium*, *Fusarium*, *Phytophthora* and *Rhizoctonia*) as well as for the control of the Botrytis grey mould and *Didymella* (*Mycosphaerella*) gummy stem blight on cucumber. Prestop is used as a soil application or as a foliar spray. It is based on the *Clonostachys* fungal strain J1446 which colonizes effectively the roots and foliar parts of plants preventing the attack of plant diseases.

Combining biological and chemical methods is a standard practice in modern plant protection. Prestop is an ideal partner in IPM programs providing many benefits: low risk for the development of resistance by pathogens, wide-range and long-lasting efficacy against pathogens, and safety for the user and the environment.



### PRESTOP® and chemical pesticides

Because the active ingredient of Prestop, *Clonostachys*, is a fungus, its efficacy can be disturbed by the simultaneous use of certain chemical fungicides. In practice, simultaneous use is not usually necessary, and Prestop can be easily combined with chemicals in rotational use. The compatibility of Prestop with certain chemical active substances has been tested in laboratory tests. See the tables below.

### PRESTOP® in IPM programs

#### 1. Root applications

Certain chemical products can be used in soil applications with Prestop even during the same day. However, in practice the best results are achieved by using different products in rotation. In the case of a severe pathogen attack, Prestop can be applied at the same time with a compatible chemical product. The chemical product responds quickly to the problem, and the biological product gives a long-lasting effect against the disease.

#### 2. Foliar applications

Sometimes a crop that is sprayed with Prestop must be simultaneously sprayed with a chemical fungicide, for instance against powdery mildew. In that case it is especially important to make sure that the substances are compatible, because the *Clonostachys* fungus will be in direct contact with the chemical substance on a leaf surface. On the other hand, foliar insecticides do not usually affect the efficiency of Prestop.

### PRESTOP® in combination with other biocontrol agents

The *Clonostachys* fungus is able to colonize the same root system as the *Streptomyces* actinobacterium, which is the active ingredient of the MYCOSTOP® biofungicide. In spite of this, it is recommended that in combination use in root applications different microbial products be applied in rotation, at different growth stages. For instance, Prestop applications can be done at seedling stage, and Mycostop applications can be done after transplanting stage.

Prestop is an ideal product for crops when insect pests are controlled by biological methods. Prestop does not cause any harm to beneficials, pollinators or nematodes.

Examples of the recommended intervals (days) between PRESTOP® and chemical fungicide treatments, based on agar plate tests.

Fungicides			
Active ingredient	Recommended interval (days)	Active ingredient	Recommended interval (days)
Ametoctradine + Dimethomorph	0	Folpet + Dimethomorph	7
Azoxystrobin	2	Fosetyl + Propamocarp	0
Azoxystrobin + Difeconazole	7	Hymexazol	7
Benthiavalicarb-isopropyl + Folpet	1	Imazalil	2
Boscalid + Kresoxim-methyl	0	Kresoxim-methyl	0
Bupirimate	0	Mepanipyrim	0
COS-OGA	0	Metalaxyl-M	2
Cyazofamid	1	Penconazole	1
Cyflufenamid	0	Procymidone	0
Cymoxanil	0	Propamocarb-hydrochloride	0
Dithianon	1	Pyraclostrobin + Boscalid	2
Difenoconazole	7	Pyrimethanil	1
Fenhexamid	0	Pyriofenone	3
Fludioxonil	4	Spiroxamine + Difenconazole	7
Fludioxonil + Cyprodinil	4	Sulphur	1
Fluopyram	0 (1)*	Tolclofos-methyl	2
Fluxapyroxad	0		

0 (1)\* An interval of 1 day is required when PRESTOP® and fluopyram are applied in the same part of the plant. When root system is treated with fluopyram, PRESTOP® can be sprayed in the foliage during the same day.

Insecticides		Herbicides	
Active ingredient	Recommended interval (days)	Active ingredient	Recommended interval (days)
Buprofezin	0	Aclonifen	0
Cypermethrin	2	Bentazone	0
Deltamethrin	0	Bentazone + Imazamox	0
Pirimicarb	0	Ethofumesate	1
Pyrethrins	0	MCPB	4
Rape seed oil	0	Pendimethalin	0
Spinosad	0	Prosulfocarb	2
Tebufozide	0	Pyridate	2

Adjuvants		Fertilizers and plant biostimulants	
Product	Recommended interval (days)	Product	Recommended interval (days)
Addit	0*	LALSTIM OSMO	0
Break Thru S240	0	Krista U (urea)	1
Bluesil SP 3307	0		
Designer	0	Growth regulators	
Heliosol	0	Product	Recommended interval (days)
Helioterpen® Film	0	Pirouette (paclobutrazol)	0
Liberate	1		
Neo-Wett (Imbentin T 080)	0	Disinfectants	
Mogiol	0	Prestop® is compatible with Resiclean (concentration below 100 ppm). The recommended interval between the applications of other disinfectant products and Prestop is 1 day.	
PureGreen Spray Oil 13E	0		
Qualibra	0		
Silwet Gold	0	Beneficial insects and nematodes	
Sticman	0	Prestop® is compatible with beneficials and nematodes	
Wetcit	0		

Microbiological products	
Active ingredient	Recommendation
<i>Bacillus amyloliquefaciens</i>	<i>B. amyloliquefaciens</i> have some negative effect on the growth of <i>Clonostachys</i> fungus in higher temperatures.
<i>Bacillus thuringiensis</i>	Compatible
<i>Beauveria bassiana</i>	Compatible
<i>Coniothyrium minitans</i>	<i>Clonostachys</i> fungus might have a negative effect on the growth of <i>Coniothyrium</i>
<i>Lecanicillium muscarium</i>	<i>Clonostachys</i> fungus might have a negative effect on the growth of <i>Lecanicillium</i> on the leaf surface.
<i>Metarhizium anisopliae</i>	Compatible
<i>Trichoderma asperellum</i>	Compatible
<i>Trichoderma harzianum</i>	<i>Clonostachys</i> fungus might have a negative effect on the growth of <i>T. harzianum</i> .
Other microbiological products applied in the growth substrate.	In order to avoid unnecessary competition between different microbes, use the products in rotation, for example at intervals of 7 days.

#### Additional information about compatibilities:

- The recommended interval between applications of PRESTOP® and active ingredient or product not mentioned in the list is 7 days
- PRESTOP® can be applied in mixtures with compatible products. However, the mixture should be applied immediately after preparation.
- Do not tank mix PRESTOP® with concentrated solutions of pesticides or fertilizers.

*Use plant protection products safely. Always read the label and product information before use.*