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'Starchy manna: a topic without end'

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The fungi causing powdery mildew on plants belong to the order *Erysiphales,* family *Erisiphaceae*. This family includes 28 genera with over 200 species. Losses from powdery mildew vary among different crops and varieties. For wheat and barley, reports from several European countries indicate losses of 10 to 20%, making them economically important. In our country, powdery mildew on wheat is an economically significant disease, with losses that can reach up to 30% (according to Chavdarov, 2014). Losses from this disease on rapeseed in Southern France reach up to 0.5 t/ha. In India, powdery mildew on okra causes significant damage - from 17 to 86%. Losses from the pathogen on peas in New Zealand reach up to 10%, and in Pakistan up to 50%. Damage from powdery mildew on cucumbers and peppers in the USA is within the range of 10-20%. The exceptionally high losses from this disease on grapevines during epiphytotic development can be judged from data for 1852, when in France they reached up to 70%.

Control measures for powdery mildew

Agrotechnical

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· crop rotation;

· plowing under of stubble and volunteer plants;

· sowing of cereals and transplanting of vegetables to be carried out at optimal times;

· ensuring optimal density;

· balanced fertilization, according to the soil nutrient reserves;

· destruction of weed vegetation;

· sanitary pruning to destroy overwintering inoculum in fruit trees and vines, as well as green pruning during the growing season to remove infected summer growth in fruit trees and removal of leaves around the grape cluster zone in vines;

Chemical

This method still remains the main one. In Bulgaria, a large number of fungicides for controlling powdery mildew in various crops have been registered and are included in the List of Authorized Plant Protection Products. In this list for 2015, 27 fungicides are included for controlling powdery mildew on grapevines, and against powdery mildew on cereals - over 20. For the remaining crops - sugar beet, rose, and strawberry, from 1 to 4 fungicides are registered.

The fungicides included in the list have different active ingredients, and a large part of them are a combination of 2 or 3 active bases. It should be noted that in organic production, only sulfur-containing fungicides can be used to combat powdery mildew. In Canada and a number of other countries, biofungicides such as Powdery mildew killer and Sporodex L have been developed for use in organic production.

Good results from chemical control are obtained only if sprayings are carried out on time and with quality using a suitable fungicide. For individual crops, a different number of treatments are recommended depending on the conditions for disease development and the sensitivity of the cultivated varieties.

The most reliable and environmentally friendly way to limit the development of all fungal diseases on cultivated plants is the cultivation of resistant or low-sensitivity varieties. In apple, all European breeding programs include the creation of varieties resistant to scab and powdery mildew. Most of the apple varieties created in recent years that are resistant to scab are also low-sensitivity to powdery mildew. So far, there is no apple variety that is resistant to powdery mildew, but a number are low-sensitivity and can be grown with a minimal number of sprays. Such are Gala, Lodi, Fuji, Prima, Priscilla, etc. The Scandinavian blackcurrant variety Ojebin is resistant to American powdery mildew. Wheat varieties with high resistance to powdery mildew are Aglika, Yantra, Enola, Neda, Vazhod, Beloslava, etc. Long-fruited cucumber varieties created for greenhouse cultivation - Kalunga, Dante, Hudson, Almeria, etc., are resistant to powdery mildew. Tobacco varieties - Krumovgrad 68 and 78, Nevrokop 261 are also resistant to the disease. Research related to obtaining powdery mildew-resistant varieties in cereals, vegetables, and fruit crops is being conducted at the institutes of the

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Agricultural Academy. The sensitivity of new varieties introduced in our country for all crops is also being studied with the aim of selecting low-sensitivity ones.

It is interesting to know that powdery mildews are attacked by their natural parasite/hyperparasite/ the fungus *Ampelomyces quisqualis*, which penetrates the mycelium of powdery mildews, where it develops and can prevent spore formation of the host. For over 50 years, work has been done with this hyperparasite to obtain a biopreparation. The resulting preparation AQ-10 represents water-soluble granules containing the fungal hyperparasite (58% viable spores of *Ampelomyces quisqualis*. Very good results from the application of the hyperparasite were obtained on cucumbers in Israel. In this experiment, it was found that most of the fungicides used to combat powdery mildew and other diseases are tolerant to *Ampelomyces quisqualis.*

A biofungicide has also been obtained – Sporodex L for controlling powdery mildew on roses and cucumbers in greenhouses, based on the fungus *Pseudozyma flocculosa.*

There are a number of scientific reports that the mite *Orthotydeus lambi* (fam. *Tydeidae*) can reduce the development of powdery mildew on grapevines. This mite feeds on the mycelium of *Uncinula necator* and its use gives good results. It should be noted that sulfur and mancozeb-containing fungicides suppress the population of *Orthotydeus lambi.*