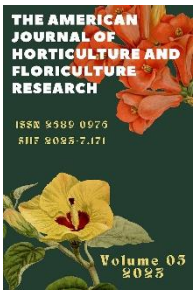
The American Journal of Horticulture and Floriculture Research
(ISSN – 2689-0976)
VOLUME 05 ISSUE 08 Pages: 23-28
SJIF IMPACT FACTOR (2020: 5. 251) (2021: 5. 731) (2022: 6. 19) (2023: 7. 171)
OCLC – 1121086298
Publisher: The USA Journals



Journal Website: https://theamericanjournals.com/index.php/tajhfr

Research Article

PEAR GARDEN POWDERY MILDEW DISEASE AND DAMAGES

Submission Date: August 20, 2023, **Accepted Date:** August 25, 2023,
Published Date: August 30, 2023 |
Crossref doi: https://doi.org/10.37547/tajhfr/Volume05Issue08-05

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ABSTRACT

This article analyzes the damage of pear varieties by powdery mildew. In the research, it was found that 11.7% of pear varieties were affected by powdery mildew in 2020, 12.3% in 2021 and 12.7% in 2022. Passkrasana and Hosui varieties of pear are resistant to powdery mildew, Nijisseyki variety is moderately resistant, and Carmen variety is resistant variety.

KEYWORDS

Pear, disease, pathogen, fungus, P.leucotricha, P.clandestina, S.Pannosa.

INTRODUCTION

Pear powdery mildew is a widespread phytopathogen in all countries of the world, including Russia, Western Europe, Japan, Ukraine, the North Caucasus, Moldova and Asia, and in some years it has been found that there are many outbreaks of the disease in Belarus, the Baltic countries, the Volga region, and the upper sub-humid regions of Russia [Peresypkin V.F 1991; Pidoplichko N.M. 1977].

This disease is widespread in Central Asian countries and occurs in all regions of Uzbekistan. In pear orchards, the damage of this disease is recorded after the diseases of pear scab and moniliosis. Also, several types of fungi cause the disease, Podosphaera leucotricha in apples and pears, Podosphaera clandestina in quince, and Sphaerotheca Pannosa in other plants

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Powdery mildew was first recorded in France, and this pathogen was named Erysiphe mali by J. Duby in 1830. [Stoll K; 1938; Groshev S.V.; 2002]. Also, the Russian scientist A.A. According to Yachevsky (1927), the first complete information on powdery mildew was disclosed by J. Leveille in France in 1852, and it was stated that the pathogen belongs to the Erisiphaceae family and is divided into the Sphaerotheca, Podosphaera, Phyllactinia families. The German scientist P. Magnus (1898) stated that in 1897 scientists N. Wunderwood and F. Eurle named this pathogen as Podosphaera oxyacanthae. After that, by 1900, E. Salmon fully described this pathogen in his research, identifying the stage of sexual reproduction and describing it as Podosphaera leucotricha (Ellis et Everhart) Salmoni, and it is still called [Yachevsky A.A. 1927; Magnus P. 1898; Groshev S.V. 2002; Pulatov A. 2023].

Pear powdery mildew disease affects the leaves, leaf and fruit bunches, petals and fruits, branches and buds of pear trees. Symptoms of damage to branches and leaves appear almost at the same time. At first, a white or light-gray, flour-like powder appears on the underside of the leaves. Also on the upper side of the leaf there is also a bubble. Over time, the powdery mildew can spread to both sides of the leaf and completely cover the leaves. Damaged branches lag behind in development, the top is covered with gray powder, and the joints develop short. In the middle of summer, the dust on the leaf and branch turns brown, in and on them the fruiting bodies of the sexual stage of the fungus - cleistothecium - develop. [Kholmurodov E.A. 2013; Sheraliev A.Sh. 2008; Hasanov B.A. 2010; Taylor R.A.J. 2019].

Infected buds open later than healthy buds. Formation, spread and germination of pathogenic conidia in buds takes place in the cool part of the day. The conidia formed in plant buds and the source of infection ensure the spread to other plants starting at noon. It is during this time that the spores of the pathogen in the air have the highest concentration and serve as a source of infection when damaging young leaves, flowers and fruits in gardens [Imre Holb. 2013; Hickey K.D. 1990].

The pathogen appears in fruits in the form of white powder in the early period of development. However, this foam quickly disappears, and a reddish net is formed on its surface, reminiscent of a porous tissue, where mechanical damage occurs. In very rare cases, cleistothecia are observed in fruits, after they are harvested, the growth of fruits slows down, the surface is covered with brown, net-like spots, and young fruits fall off [Kholmurodov E.A. 2013].

Formation of conidia in pathogenic mycelium depends on environmental conditions (temperature, humidity and light) or the age of the mycelium [Groshev S.V. 2002; Voronin E.I. 1977; Mercer R.T. 1977].

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Development of conidia in the spring when the air temperature is +7 - +8°C (optimum +18 - +22°C) and relative humidity is 60-70%, about 60% of conidia develop during the day. Conidia, which develop at high temperatures in summer, have been found to develop at temperatures of +25 - +28°C [Groshev S.V. 2002; Sukhoruchenko G.I. 2001; Hasanov B.A.; 2010;].

Summing up from the analysis of the literature, the damage of powdery mildew (P. leucotricha) in the pear orchards grown in large areas of our republic is increasing year by year. In such a situation, proper and timely organization of protective measures is important for pear orchards to preserve the crop, protect it from diseases, and deliver it to the table in good quality.

MATERIALS AND METHODS

In order to determine the spread, development and damage of the powdery mildew disease observed above in pear orchards, directional observations of several varieties were carried out in the pear orchards of the Jizzakh Scientific Experimental Station located in Sh.Rashidov District, Jizzakh Region.

100 leaves and fruits from 4 sides of the selected tree were counted on a 5-point scale [Stepanov K.M., Chumakov A.E. 1972]. V.V. Kosova and others [Khokhryakov M.K. 1969; Kosova V.V., Polyakova I.Ya. 1958;] was calculated based on the methods and using the following formula.

$$Dp= (\Sigma (a \cdot b))/(N \cdot K) *100$$

Бунда:

Dp = disease progression;

Σ (a·b) – is the sum of the plant multiplied by the expression of disease-damaged organs in points;

N – the total number of observed plant members;

K – is the highest score on the scale.

Results and its discussion. In our research, the resistance of pear varieties to powdery mildew was studied in observations. According to the observations made, pear cultivars Passkrasana and Hosui were resistant to powdery mildew disease, and the damage ranged from 8.0% to 11.7% in leaves and 7.0% to 10.3% in fruits, and the development of the disease in leaves was 3, 8% to 5.6% and 3.2% to 4.4% in fruits (diagramm).

The cultivar Nijiseiki is moderately resistant to powdery mildew, with 10.0% to 13.3% damage in leaves and 8.7% to 12.4% in fruit, disease development in leaves 4.6% to 6.5% and fruit 3 It was found that it was from 9% to 6.3%.

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The variety Carmen was resistant to powdery mildew, and the damage ranged from 14.0% to 15.0% in leaves and 11.7% to 12.7% in fruits. Disease development was 6.7% to 7.3% in leaves and 5.8% to 6.4% in fruits, respectively.

According to the obtained results, it was found that the Passkrasana and Hosui varieties of pear are resistant to powdery mildew, the Nijisseyki variety is moderately resistant, and the Carmen variety is resistant. Also, among the observed varieties, the highest 12.7% disease damage was found in the Carmen variety. The lowest incidence was 7.0% in the Hosui variety in 2020.

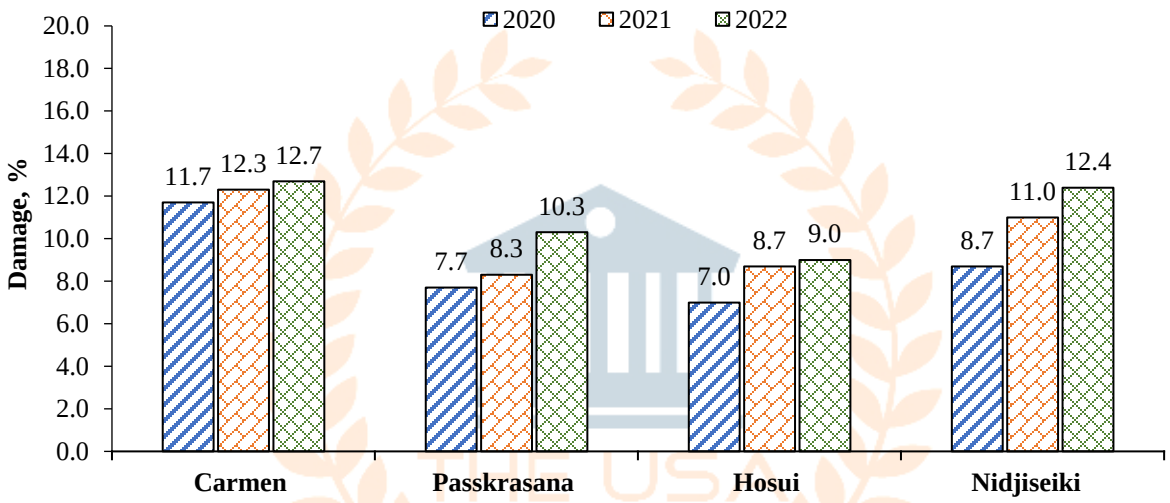

Diagramm. Damage of pear varieties by powdery mildew

Field experiments, Jizzakh scientific-experimental station, 2020-2022.

CONCLUSIONS

Summarizing the results of the research, it was found that up to 11.7% of pear varieties in 2020, up to 12.3% in 2021 and up to 12.7% in 2022 were affected by powdery mildew. Pear cultivars Passkrasana and Hosui were found to be resistant to powdery mildew, Nidjiseiki was moderately resistant, and Carmen was resistant. Also, among the observed varieties, the highest 12.7% disease damage was found in the Carmen variety. The lowest incidence was 7.0% in the Hosui variety in 2020. Based on the results of the research, it is recommended to plant Passkrasana and Hosui pear varieties and other varieties belonging to this species in areas where powdery mildew disease is widespread, and not to plant Carmen pear varieties and similar varieties.

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