

ASSESSING THE SUITABILITY OF F1 HYBRID VARIETIES IN GROWING CUCUMBER IN GREENHOUSES FOR THE EFFECTIVE CONTROL OF DOWNY MILDEW DISEASE

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Annotation

Food safety is one of the most crucial tasks facing all countries worldwide. In the mentioned article, the level of resistance to wheat rust disease in 50 selected varieties, obtained from both local and foreign germplasm, has been assessed for suitability in cultivation for hot climates, and the results of the evaluation have been highlighted.

Keywords: greenhouse, cucumber, hybrid, disease, powdery mildew, damage, resistance.

Introduction

Developed and developing countries are experiencing a setback in the growth of the volume of food production compared to the increase in population. This indicates a challenge in overcoming obstacles to the development of agriculture in countries where effective activities in the field of food cultivation have not been adequately implemented. The increasing global population, economic challenges, changes in global climate conditions, and other factors are making it difficult to meet the demand for food products. According to the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), currently, more than 840 million people worldwide, or nearly one in every 8 individuals, are undernourished and unable to consume an adequate diet [2].

In our country, ensuring the safety of food contributes to the stable development of the socio-economic situation, the improvement of citizens' health and well-being, and the preservation of the independence of the country. Thus, providing the population with high-quality food, especially beyond the seasonal periods, has gained significant importance in our country's strategy to protect people from various diseases [1].

The newly harvested fruits of the quince are enjoyed and appreciated by consumers during the winter and spring. In quince cultivation, it plays a crucial role to cultivate quince varieties that are resistant to diseases and have high productivity [5].

Powdery mildew is one of the common diseases affecting quince in our farms and orchards. Powdery mildew is widespread in Uzbekistan, Central Asian countries, and European states. Quince trees affected by powdery mildew develop white powdery patches on both upper and lower leaf surfaces, as well as on stems. Subsequently, these patches turn yellow or reddish-brown, leading to the withering and curling of the leaves [3].

Spray sometimes appears on the stems and leaf veins, and occasionally on the fruits, especially in warm climates. Powdery mildew damages plants, primarily during the flowering and fruit-setting stages in warm climates. This disease is spread by spores, mainly through the assistance of the wind. The optimal temperature for the development of the disease is considered to be between 25-27°C, with humidity ranging from 50-90%. However, spray can also harm dry leaves at temperatures of 15-25°C and humidity as low as 20%. The cultivation yield of quince grown in warm climates affected by powdery mildew may decrease by 50-70% [4].

Importance of Research. Currently, ensuring the safety of food for the population is a crucial global issue. Quince varieties suitable for cultivation in greenhouses are mainly considered as parthenocarpic types. In such varieties, the abundance of female flowers contributes to high productivity. Selecting disease-resistant varieties from these types, particularly beyond the growing season, becomes a significant issue in addressing challenges in the cultivation of quince, considering the importance of both productivity and disease resistance.

Research Objective. The aim of the study is to examine the susceptibility of quince varieties from local and foreign germplasm to powdery mildew, as well as to identify and select varieties that are resistant to powdery mildew for cultivation in greenhouses.

Research Results. Quince cultivation in our country, especially when planted in greenhouses throughout various seasons, is significantly affected by powdery mildew, especially during the winter-spring period. The study focused on 50 quince varieties from local and foreign germplasm to assess their susceptibility to powdery mildew and to select varieties resistant to the disease for greenhouse cultivation. The selection and isolation of varieties resistant to powdery mildew with good productivity and product quality are crucial steps in creating new varieties and rootstocks for the future, providing a valuable biological means to combat powdery mildew.

The quince saplings were planted in greenhouse rows with a spacing of 80 cm between rows and 35 cm between saplings within rows. Phenological observations were carried out during the growing season of quince, and the impact of powdery mildew on the plants, as well as the progression of the disease, were monitored (Figure 1).



Figure 1. Observing the Progression of Powdery Mildew in Quince Varieties during Phenological Monitoring

In the obtained research results, the development of powdery mildew was determined on a 5-point scale based on the formula by Chumakov (1974). The progression of the disease was determined using the following formula:

$$P = \frac{n \cdot 100}{N} \text{ where:}$$

P is the progression of the disease in percentage (%),

n is the number of infected plants in the sample,

N is the total number of plants in the sample.

The development of the disease in cucumber varieties was assessed on a 5-point scale according to the following criteria:

0 - Healthy plants,

1 - Damaged up to 10%,

2 - Damaged from 11% to 25%,

3 - Damaged from 26% to 50%,

4 - Damaged more than 50% (Dementyeva, 1985).

The progression of the disease is determined based on the formula developed by Chumakov in 1974:

$$P = \frac{\sum(a*b)}{N} \text{ where:}$$

P – is the average degree of disease progression in percentage (%) or points,

$\sum(a * b)$ is the sum of the product of the number of plants (a) and the corresponding percentage or score of damage (b),

N - is the total number of assessed plants.

When studying 50 quince varieties suitable for greenhouse cultivation, it was found that 7 of them were affected by powdery mildew in different degrees. The development and progression of the disease in the affected quince varieties are presented in Table 1.

1 – table The incidence of powdery mildew in cucumber F₁ hybrid varieties suitable for greenhouse cultivation (RIVMCP greenhouse 2023).

No	Hybrid forms	Damage average score	Disease development %	Spread of disease %
1	Model 4358/19 F ₁	1.0	3.5	10.0
2	Suzan F ₁	1.0	3.9	10.0
3	Yakamoz F ₁	1.0	3.6	10.0
4	Apolov F ₁	1.0	4.0	10.0
5	Donchak F ₁	1.0	4.8	44.7
6	Metreng F ₁	1.5	4.5	32.5
7	2871 F ₁	2.0	2.7	45.3

In our conducted research, the quince varieties Sardor F₁ (n-t), Sevinch F₁, Dayara F₁, Samar F₁, Baxora F₁, Sherin F₁, Durafshon F₁, Avrora F₁, Smart F₁, Konkur F₁, Rekord F₁, Pikolino F₁, Insi F₁, Iskandar F₁, Baby mini F₁, Orzu F₁, Kuraj F₁, Spiny F₁, Fenomeno F₁, Model 4363/18 F₁, ES 2718 F₁, Xuligan F₁, Model 6128/18 F₁ did not get infected with powdery mildew during the growing season.

In our conducted research, the following quince varieties, Model 4358/19 F₁, Yakamoz F₁, Suzan F₁, Apolov F₁, exhibited a disease progression of 10%, and the damage caused by the disease was rated as 1 point. For the Donchak F₁ variety, the disease progression was 44.7%, resulting in a damage rating of 1 point. In the case of the Metreng F₁ variety, the disease progression was 32.5%, with a damage rating of 1.5 points. However, for the 2871 F₁ variety of quince, a higher susceptibility was observed compared to other quince varieties, with a

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disease progression of 45.3% and a damage rating of 2.0 points, as determined during the conducted research.

Conclusion. To select quince varieties resistant to powdery mildew for cultivation in greenhouses, 50 quince varieties were studied from local and foreign germplasm. According to the obtained research results, the quince varieties Sardor F1 (n-t), Sevinch F1, Dayara F1, Samar F1, Baxora F1, Sherin F1, Durafshon F1, Avrora F1, Smart F1, Konkur F1, Rekord F1, Pikolino F1, Insi F1, Iskandar F1, Baby mini F1, Orzu F1, Kuraj F1, Spiny F1, Fenomeno F1, Model 4363/18 F1, ES 2718 F1, Xuligan F1, Model 6128/18 F1 did not get infected with powdery mildew during the growing season. These varieties were selected as suitable for cultivation in greenhouses as powdery mildew-resistant quince varieties.

List of Used Literature.

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