



Effect of Viruses on Potato Productivity

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Abstract: Virus diseases of potato are widespread in Uzbekistan. The amount of damage they cause depends on many factors, including the biological characteristics of the variety.

In potato varieties, plant productivity decreases to varying degrees under the influence of viruses. The amount of damage caused by viruses depends on the species. In both studied varieties, this indicator was 6-9% for virus X, 15-28% for virus C, and the effect of leaf curl virus reached 18-33% under the influence of these factors, i.e. The biological characteristic of varieties in terms of damage by viruses is great. As a result of latent infection of potatoes with Y-virus, it was found that, depending on its biological characteristics, the productivity of varieties is reduced by 13.6-24.0%.

Keywords: potato varieties, environmental conditions, seed productivity, viral diseases, latent viruses, obvious harmfulness, damage factor, yield, productivity, crop structure, etc

Introduction. The most common and dangerous potato diseases are viral and mycoplasmal diseases, which are infectious diseases. These diseases are widespread in our republic, and the amount of damage they cause depends on the type of virus, strain, and incidence of potato. plants, biological characteristics of the variety, soil and climatic conditions and agricultural practices are not the same and can lead to the complete death of the crop. In addition, they are one of the main factors that make it difficult to plant seeds. As a result of vegetative propagation of potatoes, the infection is transferred to further propagation, which in turn leads to a decrease in the quality of seeds.

The magnitude of the damage caused by viruses is characterized by the fact that not only the seed quality of the crop is reduced, but also the yield. The decrease in yield, in turn, is determined by the characteristics of the variety, soil and climatic conditions, the effect of technological elements used in the cultivation of agricultural crops, the type of infection and other factors.

In order to study the effect of various viruses on the productivity indicators of different potato varieties, we conducted studies, the results of which are described below.

Materials and methods. The studies were carried out on the experimental fields of the Samarkand experimental station of the research Institute of vegetable-Rice crops and potatoes of Uzbekistan in 2021-2022.

The objects of our experiment were potato plants of varieties Farovon, Feruza and Sante, healthy in seed pods, but latently infected with viruses identified on the basis of serological and enzyme immunoassays carried out during the sowing period. These plants were re-examined during the flowering period, and those infected with other viruses were controlled separately. During harvesting, plants infected with the Y-virus were dug up separately and the productivity indicators were determined. As a control, healthy plants of the studied varieties were taken from these sites.

Phenological observations and biometric measurements during field experiments of the All-Russian Research Institute of Potato Growing (RIPG, 1989), laying cuttings and taking plant samples and their analysis "Methods for conducting experiments in vegetable growing, potato growing and potato growing" (T., 2002) and "Field experiments "Methods of transmission visible infection of plants with viral diseases by a visual method, latent infection of plants with viruses X, S, M and Y using serological tests "Guidelines for the serological diagnosis of viruses and bacteria that infect potatoes. M.1972) was carried out in method. Plant productivity was determined by determining the yield of individual bushes, and the yield of varieties and samples was determined by converting the amount of yield obtained from the site per unit area according to the methodology of the State Variety Testing Commission (1987) . The results obtained in the experiments were analyzed mathematically and statistically according to B. A. Dospekhov (1985).

Results and their analysis. The data obtained as a result of our studies show that the productivity of plants decreases depending on which virus they are infected with. It has been established that the coefficient of harmfulness of viruses also depends on the external environment. The results of sowing seeds of both studied varieties with the same reproduction characteristics in the mountainous and plain zones allow us to draw the following conclusions. For example, in the foothill zone, the productivity of the Sante variety infected with the X virus decreased by an average of 9%, while in the flat zone this figure was 12%. In the studied variety Farovon, this indicator decreased by 6-10%, and the M virus reduced productivity by 8-10% and 11-13%, respectively.

With visual detection of leaf curl, this figure was 18-33%. For the Sante potato variety, this indicator was 18% in the mountainous zone, 27% in the flat zone, and for the Farovon variety, these figures were 22 and 33%, respectively.

As can be seen from the table, the productivity of potato varieties is reduced to varying degrees under the influence of viruses. Based on the biological characteristics of these varieties, this means that they are resistant to a particular virus. For example, it was found that the decrease in productivity was less when infected with Farovon, cultivar M Sante and leaf curl virus.

Table 1. The coefficient of infection of potato varieties by the virus in various soil and climatic conditions

№	Viruses	Varieties of viruses harm coefficient			
		Sante variety		Farovon variety	
		foothills zone	plain zone	foothills zone	plain zone
1	X	9	12	6	10
2	S	15	20	22	28
3	M	8	10	11	13
5	Leaf twist	18	27	22	33
6	Complex of viruses (X + S + M + Y)	22	24	24	34

It was found that the varieties studied during the research were affected by viruses to varying degrees. This allows us to conclude that their genetic relationship with pathogens is associated with the genotype of varieties. Therefore, we believe that in the conditions of Uzbekistan, the resistance of new potato varieties to viruses should be considered as one of the evaluation criteria for entering them into the state register.

A decrease in productivity under the influence of viruses was observed in the Sante variety due to a decrease in the number of buds, and in the Farovon variety due to a decrease in the mass of buds.

It should also be noted that the damage caused by viruses is greatly influenced by the biological characteristics of varieties.

The results obtained showed that infection with the Y-virus caused a decrease in plant productivity of all studied varieties by 13.6-24.0%.

It can be seen from the data in the table that the influence of the variety factor on the amount of damage caused by viruses is great. That is, on the field, where the same conditions and agricultural techniques were used, the Y-virus reduced the yield of the Feruza variety by 13.6%, while in the Farovon variety this figure was 20.4%, and in the Sante variety - 24%.

It should be noted that the decrease in potato productivity under the influence of the Y-virus depends on the biological characteristics of the varieties. For example, a decrease in yield was observed in all studied varieties due to a decrease in the average weight of buds, and in varieties Farovon and Feruza, due to a decrease in the number of buds (Table 2)

Table 2. Influence of the Y-virus on the productivity of potatoes.

Varieties	Productivity of healthy plants			Productivity of plants infected with Y-virus			Decrease in productivity %
	gramm / bush	Tubes		gramm / bush	Tubes		
		quantity, pc / bush	gramm the average weight		number, pc / bush	gramm the average weight	
Faravon	540	8,8	60,7	430	8,2	52,2	20,4
Feruza	620	9,2	67,4	536	9,0	59,5	13,6
Sante	435	6,0	72,5	330	6,1	54,1	24,0

EKF05 gram / bush - 24.2 - 40.1

It should also be noted that these indicators could be infected with other strains of this virus that cannot be determined using serological analysis, except for the variety factor. However, taking into account that the effect of all strains of the same virus on all varieties leads to similar results, we can conclude that latent infection with the Y-virus reduces potato productivity by 13.6-24.0%, depending on the immunobiological characteristics of the variety. . Other factors may also affect the amount of damage.

Taking into account the results obtained, along with the correct selection of the variety, at all stages of the primary sowing of potatoes in a row, it is necessary to apply measures against latent viruses using selection based on serological and enzyme immunoassays.

Conclusions. The results obtained show that a decrease in plant productivity as a result of infection of potatoes with viruses can reduce plant productivity by 6-34%, depending on the biological characteristics of the variety, the type of virus and the degree of plant damage.

The obtained results show that the harmfulness coefficient of potato viruses depends on the characteristics of the variety and the environment, and the amount of damage caused by infections increases in the plain zone, while they are less harmful in the foothills. These characteristics should be taken into account when choosing varieties for specific conditions.

To reduce the size of potato infection by viral diseases, it is necessary to apply measures against latent viruses using selections based on serological and enzyme immunoassays at all stages of the initial sowing.

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