Spectrum Journal of Innovation, Reforms and Development
Volume 16, June, 2023 | ISSN (E): 2751-1731
Website: www.sjird.journalspark.org

EFFECT OF MDMV ON CORN GRAIN QUALITY

Собирова З. Ш.,
Файзиев В. Б.
Чирчикский государственный педагогический университет, Узбекистан.
Email:z.sobirova@cspi.uz

Abstract
Corn is one of the most widespread cereal crops in the world. Unfortunately, like many other plants, corn is susceptible to various diseases that are often found on the territory of Uzbekistan . Among pests, corn borers, swedish flies, aphids and cutworms cause great harm to corn. They cause significant damage to crops, the total yield can be reduced by 30-35%. About 3000 phytoviruses are known in the world. By the beginning of the 21st century, 1000 viruses have been described , of which more than 200 species of viruses that infect cereals have been identified, which are assigned to the families Bromoviridae, Potyviridae, Rhabdoviridae, Luteviridae [1]. Of these viruses, the most common is the dwarf mosaic virus. Maize dwarf mosaic potyvirus (MDMV) causes a characteristic mosaic lesion of leaf blades.

Introduction

The virus survives the off-season in the rhizomes of humai (Sorghum halepense Pers). It is transferred to healthy plants only by mechanical sap inoculation. Young plants in the phase of 3-7 leaves are more susceptible to the pathogen. At later stages of plant development, the effect of the pathogen is weak [4]. The disease is characterized by a pronounced natural foci. Virions are carried by various types of aphids, most of all Myzodes persicae Sulz. The main reserve of the pathogen is humai - Jones grass. It is from this plant that aphids transmit the infection to healthy plants of corn, sorghum, and Sudan grass [1]. On humai, the mosaic appears only on the leaves of young plants; on adults, it often disappears altogether [4].

A viral infection, penetrating into a plant organism through an aphid bite, begins to destroy cellular structures. In conducting tissues, gradually destroying, cell by cell, viral particles pass through the system of the infected plant organism [5,6].

Virus-infected plants, after the penetration of the infection, a “stress state” is observed, that is, oxidative processes increase. Due to the loss of assimilation cells, there is a lack of reserve nutrients, which subsequently reduces cell metabolism. These changes result in the inhibition of plants. The lack of nutrients affects the reproduction of plants: the formation of the cob slows down, sometimes the cobs are reduced. Educated cobs quantity and quality of grain do not correspond to the standard [7] . The grain of diseased plants is smaller than the grain of healthy corn plants (Fig. No. 1).

Fig. No. 1. The photo shown is a comparative analysis of grains of viral and control samples.

Research methods. The quality of the grain is also related to the structure of the crop. The quality of grain depends on its composition: protein and starch content. To determine the effect of the virus on grain quality using the Lowry method, we determined the grain proteins of maize varieties of infected and control samples [7,8].

In this study, total proteins were isolated from grains of soybean plants belonging to 7 different varieties of maize. The isolation of proteins from corn grains was carried out as follows: 1 g of soybean grains of each corn variety was crushed to a state of flour using a homogenizer and degreased with acetone in a ratio of 10:1 for an hour at room temperature. The homogenate was filtered, and the extract remaining on the filter was dried for 24 hours. The dry defatted homogenate was extracted with 0.2 M NaOH 10:1 at room temperature for 2 h with stirring.

Then the extract was centrifuged at 4500 rpm for 30 min, and the sedimentary fluid was dialyzed against distilled water for 12 h. After dialysis, the total protein content in the samples was determined by the Lowry method and lyophilized.

The Lowry method is based on the staining of aromatic amino acids in the detected protein with Folin's reagent [6,7].

To determine the amount of proteins according to the Lowry method, 2.5 ml of reagent C (50 ml of reagent V + 1 ml of reagent A) was added to 0.5 ml of the test solution and left for 10 minutes. Then 0.25 ml of reagent D was added and kept in the dark for 30 minutes with thorough mixing, after which the level of staining was determined using a spectrophotometer at a wavelength of 700 nm.

Results of the study and their discussion. The results obtained were calculated according to the formula and compiled a table for this study. According to the results, virus-infected grains have few common proteins (Table No. 1).

Table number 1. Table definition of total proteins in the composition of infected and control samples of corn varieties .

Variety catalog number	Name of varieties	Whole milk grain	qty grain proteins	
			TO-%	s*- %
NS13866	Osnova209	1gr	3 , 14±0.002	2.79 ± 0.005
NS16695	Extra Early Dightau209	1gr	3 , 26±0.019	1.72 ± 0.0009
NS17641	San Pedro L.A.T.	1gr	3 , 71±0.023	2 , 94±0.007
NS17646	Sherzod	1 gr	4 , 58±0.019	3 , 08±0.018
NS24935	Hickax	1 gr	3 , 73±0.0057	3 , 06±0.009
NS25033	205-2	1 gr	2 , 75±0.002	2 , 03±0.0012
NS25897	San Pedro2 IMTA	1 gr	3.35±0.0026	1.98±0.001

The results obtained were calculated according to the formula and compiled a table for this study. The results show that infected, virus-infected grains have few common proteins.
This table shows that in infected samples, the amount of proteins of the Osnova209 variety is -1.65% less proteins than in control samples. And the variety Extra Early Dightau 209 this difference reaches 1.54%. San _ Pedro LATA -0.77%, Sherzod-1.5%, Hickax -0.8%, in variety 205-2 this result reaches 0.72% and in variety San Pedro2 IMTA-1.37% is reduced.

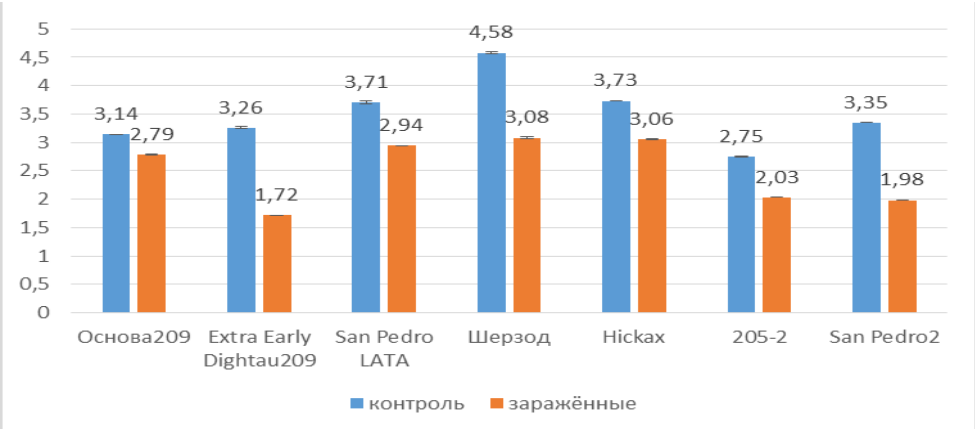

Fig. No. 2 . Comparative chart for the determination of total grain proteins of maize varieties.

As a result of the experiments, it was found that the average amount of protein in healthy samples was 3.5%, and in infected 2.5%. The total proportion of proteins in grains decreased by 1.4 times, that is, by 71.42%.

The viral disease has a negative impact on the quantity and quality of grains in maize varieties grown for grain, sometimes without damaging the biomass. According to the results of our experiments to determine the effect of the virus on productivity, as well as the quantity and quality of fruits in corn varieties infected with a viral disease, therefore, it is

necessary to take measures to combat the virus. One of the measures to combat the viral disease is to use resistant varieties [8,9,10].

BIBLIOGRAPHY

1. Vlasov Yu. I., Larina E. I. Agricultural virology.- M .: Kolos, 2016.- 239 p., Ill.- (Textbooks and textbooks, manuals for higher agricultural education, institutions). Vlasov Yu.I. Viral and mycoplasmal diseases of plants.
2. Kartasheva I.A. Guidelines for laboratory classes in the discipline "General Phytopathology". Section "Phytopathogenic viruses" - Stavropol, 2007. - 43 p.
3. Ivashchenko V.G. Maize productivity as a factor in the regulation of resistance to stem rot on the example of Fusarium verticillioides (Sacc.) Nirenberg – Zea mays L.. / Plant Protection Bulletin. 4(90) – 2016, p. 38–44.
4. Davranov K.S. Characteristics of the maize dwarf mosaic virus isolated in Uzbekistan. Candidate.of.Biol.Sci., Kiev, 1984.
5. Lapierre, H.; Signoret, P. A. *Viruses and Virus Diseases of Poaceae (Gramineae);* Institut National de la Recherche Agronomique: Paris, France, 2004; ISBN 2738010881.
6. Sobirova, Z.S., Fayziev, V.B., Abduraimova, K.I. Effect of the virus of the yellow dwarf corn mosaic growth and development of varieties of corn in various phases.Journal of Advanced Research in Dynamical and Control Systems, 2020, 12(6 Special Issue), стр. 602–606
7. Fayziev, V., Jovlieva, D., Juraeva, U., Shavkiev, J., Eshboev, F. Effects of PVXN-UZ 915 necrotic isolate of Potato virus X on amount of pigments of Datura stramonium leaves. Journal of Critical Reviews, 2020, 7(9), стр. 400–403.
8. Sattorov, M., Sheveleva, A., Fayziev, V., Chirkov, S.(2020). First Report of Plum Pox Virus on Plum in Uzbekistan. Plant Disease , 104(9), pp. 2533