UDC: 632.38:633.1:631.529(478) DOI: https://doi.org/10.53040/ppap2026.08

MANAGEMENT OF PLANT VIRUSES WITH AGRICULTURAL IMPACT

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According to the International Committee on Taxonomy of Viruses there are more than 2,100 plant virus species have been recognized. Several viruses cause in infected plants a wide range of morphological and physiological disorders that result in significant yield losses of important crops. The agriculture practices, intense global exchange of plant material, the new cultivars under the climate change create favorable conditions for the appearance of new pathogens and strains. The study of economically important viruses is significant in the development of various practices and strategy for sustainable agriculture.

Research on the incidence and consequences of infections in cultivated plants in the Republic of Moldova is sporadic and limited to a relatively small number of species. More ample investigations were conducted during the 1980s and 1990s, particularly on horticultural plants. In the Republic of Moldova, annual crops constitute the basis of agricultural production, both in terms of cultivated area and economic importance. They account for the majority of arable land (approximately 90–95 %) and include cereal crops (wheat, maize, barley), industrial crops (sunflower, sugar beet, rapeseed), legumes (soybean), and vegetables.

The barley yellow dwarf disease is the most significant disease of wheat-growing world regions, caused by the Barley Yellow Dwarf Virus or Cereal Yellow Dwarf Virus. Based on some reports this disease is responsible for 11 to 33% annual yield loss. Another disease with regional importance is wheat streak mosaic disease caused by alone Wheat Streak Mosaic Virus (WSMV) or in complex with Triticum Mosaic Virus, and High Plains Wheat Mosaic Virus. Among these three viruses, WSMV is widely distributed in most of the wheat growing regions, including the Republic of Moldova. In the condition of our country also can be described: Barley Yellow Dwarf Virus; Cereal Yellow Dwarf Virus; Soil-Borne Wheat Mosaic Virus, Wheat Spindle Streak Mosaic Virus and Triticum Mosaic Virus.

Numerous viruses have been identified in barley (around 33), but only a few are considered of major economic impact. In our country the most important are Barley

Yellow Dwarf Virus, Barley Yellow Mosaic Virus, Barley Mild Mosaic Virus, Barley Stripe Mosaic Virus.

Nearly 36 viruses have been reported infecting maize in different countries. In Eastern European countries and in the Republic of Moldova, the most important maize viruses are Maize Dwarf Mosaic Virus and Sugarcane Mosaic Virus. Other viruses, such as Maize Chlorotic Mottle Virus, have a more limited geographical distribution and are not considered widespread in this region.

Over 100 viruses have been identified in soybean worldwide, but only about 19 cause significant economic losses. In Europe and in the Republic of Moldova the most relevant are Soybean Mosaic Virus, Alfalfa Mosaic Virus and Cucumber Mosaic Virus (CMV) – found also in numerous legumes and cultivated plants. Bean Pod Mottle Virus is important especially in the USA, Canada, while data on its identification in our country are lacking.

Tomato Spotted Wilt Virus (TSWV), CMV, and Tomato Yellow Leaf Curl Virus (TYLCV) are important viruses infecting various vegetables around the world. TSWV infects >800 plant species and can cause yield losses of up to 100% in several vegetables. CMV has a broad host range infecting >1,200 plant species in over 100 families. Yield losses from CMV infections varied from year to year and from crop to crop, with 25 to 50% of tomato, 60% of melon, up to 80% of pepper, 30-100% in tomato. TYLCV is the causal agent of tomato yellow leaf curl disease, the most economically important virus disease, which can dramatically reduce productivity with up to 100% yield loss in susceptible tomato cultivars. Data on the occurrence and identification of TYLCV under the conditions of the Republic of Moldova are lacking, although the presence of the virus has been reported in neighboring countries. Furthermore, there is a lack of information regarding viral diseases and their causal agents affecting industrial crops.

In the absence of a comprehensive study of viral infections in cultivated plants, considering the very limited number of cultivars resistant to viral pathogens, provides effective phytopathogens management strategies and advancing sustainable agricultural systems cannot be developed.

Keywords: plant viruses, crops, diseases, annual crops.

Acknowledgments. The research was carried out within the subprogram 011101 "Genetic and biotechnological approaches to agroecosystem management under climate change conditions", financed by the Ministry of Education and Research of the Republic of Moldova.