

# Simulated Microgravity Effects on the Resistance of Potato Plants to Viral Infection

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Our earlier research results showed that prolonged clinostating impeded the reproduction of the wheat streak mosaic virus (WSMV) in artificially infected Apogee wheat plants. The WSMV reproduction reduction leads to the formation of yield at the expense of the various physiologo-biochemical mechanisms of adaptation. The results of our research activities open up the possibilities for the creation of new biotechnologies for both orbital and terrestrial conditions. There arises a need to verify this phenomenon on potato plants which reproduce by tubers and in which viral infection, unlike the WSMV, is easily spread with planting material. The initial parental potato plants were cultivated in a universal clinostat "Cycle-2" and horizontal clinostat KG-8 on artificial substrate employing a balanced nutrient mixture of macro and microelements. Viral antigens were detected in the organs of infected plants by a solid-phase immunoenzymatic analysis in its indirect das-ELISA variant (sandwich variant). A test system manufactured by the Bioreba firm (Switzerland) was employed for diagnostics. The reader of the Termo Labsystems Opsis<sup>MR</sup> firm was employed for the measurements of optical density of the immunoenzymatic reaction product with a software of the Dynex Revelation Quicklik (USA) at wavelength of 405/630 nm. Virion identification was carried out using the electron microscopy (negative contrasting procedure). Statistical data processing was performed using Excel AGROSTAT program. We investigated the effects of clinostating on the development of viral infection in a number of naturally infected varieties of potato, including Serpanok, Linda, Dara, Krimchanka, Bellarosa, Agave, Synyoglazka and Krymska Rosa. Varietal differences were detected in host plant reaction on viral infection and the conditions of clinostating. Bellarosa variety showed a considerable reduction in the PVY concentration. A positive correlation was found between the intensity of growth processes and the content of viruses in the leaves of Synyoglazka variety. The impediment of growth processes by the 8-day preplanting clinostating of the tubers favored a considerable reduction in the X and S virus content in the leaves on the 43 d day after planting, as compared with control testing variant. Potato plants also showed a variety-specific reaction on such abiotic agents as the change of the longitudinal plant axis in relation to the gravity force vector (clinostating). Thus Synyoglazka plants displayed a stunting of growth processes with clinorotation in "Cycle-2", whereas Krymska Rosa plants showed their stimulation. *In vitro* clinostating of the potato plant explants with the use

of potato in a nutritive mixture also showed the tendency of viral infection to elimination. We think that our research findings on the effects of potato and clinostating on potato plants *in vitro* may become cornerstones for the development of practices of virus elimination under conditions of microclonal reproduction.