THE RESPONSE OF OFFSPRING OF VIRUS-INFECTED TOMATO PLANTS TO ABIOTIC FACTORS AT THE GAMETOPHYTIC AND SPOROPHYTIC LEVELS

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Abstract

The investigation assesses the influence of abiotic factors (heat/drought) on some biomorphological traits of sporophyte and male gametophyte in the virus-free offspring from virus-infected tomato plants (Tobacco Mosaic Virus or Tomato Aspermy Virus). The variance analysis of the evaluated traits, in both sporophyte and gametophyte, under abiotic stress conditions revealed, as a rule, a significant contribution of stress in the variability, followed by the effects of genotype and plant health status with different strength. The analysis confirmed the significant influence of genotype (5.6...19.7%), heat (21.7...81.5%), drought (55.4...82.1%), health status (2.9…36.8%), and their interactions on the variability of male gametophyte traits. In most cases, the influence of stresses caused suppression of the evaluated traits' values. Under conditions of heat or drought, depending on plant' health status, it was confirmed the specific manifestation of some traits in sprout (radicle length, growth intensity), plant (plant height, number and leaves length) and male gametophyte (pollen viability, pollen tube length). Thus, specific effects expressed by stimulation, inhibition or lack of differences for the analysed traits were observed in the offspring of virus-infected plants under heat or drought conditions compared to the optimal one. Analysis of pollen variability spectra for each genotype showed differences in sensitivity to the action of the factors, which allows description of the microgamete reaction to stress and application of the obtained data for predicting sporophyte resistance.

Key words: Abiotic stress, gametophyte, plant health status, sporophyte, virus