UDC: 635.64:581.163:632.112 DOI: https://doi.org/10.53040/ppap2026.116

# THE INFLUENCE OF WATER DEFICIT ON DIVERSITY OF TOMATO PROGENY AT HAPLOID LEVEL

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It is known that climate change, including drought, disrupts key processes involved in reproductive efficiency in most crops. Under water deficit, in many cases, the elimination of pollen grains is observed, since their formation requires high water availability. The purpose of the study was to evaluate the impact of water stress on the quality of the male tomato gametophyte in order to identify genotypes with potential drought resistance. The research was carried out under laboratory, solarium and experimental lot conditions. The descendants of the tomato varieties Rufina, Elvira and the spontaneous specie *Solanum pimpinellifolium*, derived from plants infected with viruses and treated with glycosides, were used as experimental material. As virus agents in recurrent plants were used Tomato Aspermy Virus (TAV) or Tobacco Mosaic Virus (TMV). Determination of male gametophyte viability in the control variant was performed by cultivating pollen on artificial nutrient medium, containing aqueous sucrose solution - 15%, boric acid - 0.006%. In order to assess the reaction of the male gametophyte to the action of water deficit, medium supplemented with sucrose was used (32%). Based on the microscopic study, the following indices were determined: viability and resistance of pollen; length and resistance of pollen tubes (PT).

Water deficit induced specific changes in the analyzed traits. In healthy plants, water deficit reduced pollen tube length by 1,5 times, in TMV/TAV genotypes the values of these indices compared to the control were reduced by 1.6…2.7 times. In the descendants of plants treated with glycosides, the decrease in these characters was 1.7...2.6 times. In over 80% of variants, pollen viability decreased by 10-20%, whereas stimulation was recorded in only 11% of cases. Based on the analysis of the pollen tube dimensions change, it was established that water deficit acted strongly

on the variability of this character, reducing its values by 40-45 conventional units in treated with glycosides plants in 55.0% of cases compared to untreated in 44.4. According to the three-factor dispersion analysis, the record variability was controlled by the genotype, glycoside, water deficit and their interaction ($P<0.001$). In healthy plants or TAV, the genotype determined 21.1...53.8% of the variation of this index. The influence of glycosides was lower and varied within 4.5...14.0%, while the water deficit caused most of the variability 18.5...54.5%. Notably, the action power of water deficit was reduced by 7.0-9.0% compared to the results obtained in the analogous experience in previous generations. In the descendants of TMV/TAV, the action of water deficit significantly decreased the growth rate of pollen tubes and controlled 66.7...81.1% of the variability of this character, the quota of glycoside action was much lower. Statistical analysis showed that the average values of male gametophyte resistance varied within the limits of 50.6…65.1% (for pollen viability) and 44.4…59.35 (for pollen tube length). Among the analyzed variants, we established that the average values of these indices were exceeded in 38.9 and 44.5% of cases. Consequently, water stress causes significant changes in pollen indices, which are mainly determined by the action of water deficit on the microgametes differentiation according to the genotype reaction to this factor.

**Keywords:** tomato, water deficit, pollen grains, virus infection, glycoside, resistance, tolerance.

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