Hybridological Analysis of Inheritance of Mosaic *npt*II Gene Expression in Transgenic Tobacco Plants

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Abstract—On the basis of the results of hybridological analysis, it was established that significant differences in the stability of manifestation of the *npt*II gene expression are observed between the Nu5 and Nu6 lines obtained from the same initial Nu21 transformant (in spite of the identical genetic environment). Relatively stable expression of the marker gene is registered in the Nu5 line; the frequencies of detection of mosaic descendants are not high. The Nu6 line is characterized by a high frequency of the appearance of mosaic plants (up to 100%), indicating an increase in the marker gene inactivation in this line. When combining the *npt*II gene alleles in the hybrid genome, the allele coming from the Nu6 line was manifested as semidominant and had a suppressing effect on the allele coming from the Nu5 line. No transinactivation phenomena at the level of phenotype were detected during the interaction of the *npt*II gene alleles from the Nu5 and Nu6 lines in diheterozygote with the alleles of homologous genes inactivated at the transcriptional or post-transcriptional levels. During segregation to F_2, separation of the Nu21 line progeny into two independent groups with preservation of the different character of the marker gene expression (with a moderate level of appearance of mosaic plants for the Nu5 line and with high level for the Nu6 line) was again registered. Further studies are directed to detection of the mechanisms leading to the mosaic type of the studied gene manifestation in transgenic plants of the Nu5 and Nu6 lines.

Keywords: mosaic gene expression, transgene silencing, crossing of plants, trans-inactivation, gene interaction

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