

VARIABILITY OF AGRO-MORPHOLOGICAL TRAITS IN SC₅ TRITICALE SOMACLONES FOR THE SELECTION OF VALUABLE BREEDING MATERIAL

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The evaluation of agro-morphological traits enables the assessment of genetic diversity and the discrimination of genotypes. The continuous exploitation of novel genetic resources is essential for the advancement of breeding programs and the development of new triticale genotypes with enhanced productivity and adaptability. In this context, evaluating the effects of *in vitro* culture and gamma irradiation, applied either individually or in combination as methods for inducing genetic variability, on the quantitative traits of SC₅ triticale somaclones is of particular interest for the identification of superior genotypes with breeding potential.

The biological material consisted of SC₅ triticale somaclones derived from three cultivars, Ingen 35, Ingen 93 (standard cultivar), and 188TR 5021, obtained through *in vitro* culture and exposed to gamma irradiation, together with their respective control plants.

The analysis of agro-morphological traits, including plant height, main spike length, length of last internode length, number of fertile tillers and internodes per plant, number of grains per spike, grain weight, and 1000-grain weight, revealed pronounced somaclonal variability. Depending on the genotype and the experimental factor, statistically significant differences in the mean values of the analyzed traits were observed among the SC₅ triticale somaclones at the 95–99% significance level. Biometric evaluation identified SC₅ somaclones of genotype 188TR 5021 (*in vitro*) as the most promising, exhibiting significantly higher mean values than the control for four traits, namely plant height, main spike length, last internode length, and 1000-grain weight (95–99.9% significance level). The coefficient of variation ranged from 4.82 to 10.33%, indicating a high degree of uniformity among the evaluated individuals.

Analysis of the contribution of the studied factors to the expression of quantitative traits in SC₅ somaclones demonstrated that genotype was the predominant

source of variation, accounting for 0.94–42.21% of the total variation. The highest contribution of the genotype was recorded for last internode length (25.47%) and 1000-grain weight (42.21%). The effect of *in vitro* culture was most pronounced for plant height (21.48%) and last internode length (18.07%). Gamma irradiation exerted its greatest influence on last internode length (20.97%), 1000-grain weight (20.30%), and grain weight (14.75%). The interaction between genotype and *in vitro* culture ranged from 0.55 and 33.02%, with the highest values observed for 1000-grain weight (33.02%) and plant height (19.07%). The interaction between genotype and gamma irradiation ranged from 1.25 to 19.39%, whereas the highest interaction effect was recorded for plant height (19.39%), last internode length (19.11%), and 1000-grain weight (14.94%).

The somaclonal diversity induced by *in vitro* culture and gamma irradiation, assessed through agro-morphological traits such as plant height, main spike length, uppermost internode length, grain weight, and 1000-grain weight, provides valuable information for the identification and selection of superior triticale genotypes with high breeding potential.

Keywords: triticale, somaclones, *in vitro*, radiation, quantitative traits

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