serves not simply as a source of random abnormalities, but as a controlled tool for broadening the genetic base available to breeders.

The results of the present study indicate that DAB is an effective mutagen for both domestic and foreign winter wheat germplasm. At the same time, the material generated after treatment appears to be more valuable as a parental resource for recombinant breeding than as a direct source of ready-to-release cultivars. In other words, DAB treatment primarily expands the pool of useful variation rather than immediately producing finished commercial genotypes.

A particularly important outcome of the study was the observation that several traits usually regarded as genetically conservative or difficult to modify nevertheless showed meaningful variability under DAB treatment, while undesirable side effects remained comparatively limited. Moreover, even with increasing mutagen concentration, the frequency of unfavorable trait combinations remained relatively low. This distinguishes DAB favorably from many traditional mutagens. At the highest tested concentration, 0.3%, negative combinations were still uncommon, which substantially reduced the loss of otherwise promising mutant forms.

Another noteworthy pattern was the close relationship between economically important traits and the overall frequency and spectrum of visually detectable mutations. Under DAB treatment, this association was especially clear and appeared to differ from patterns described earlier for classical chemical supermutagens. This suggests that DAB may induce a somewhat distinct mutational profile, one that may be more favorable for practical breeding when properly matched with suitable source material.

The experimental results also provided insight into the dynamics of mutation induction. In general, greater mutagenic intensity and higher dosage are often associated with reduced site specificity. However, under DAB treatment the situation appeared more complex, indicating that this mutagen may behave differently from many standard chemical agents. Earlier research likewise suggests that DAB-induced mutations can serve as a stable and renewable source of useful local diversity, contributing to the improvement of spike morphology, earliness, and disease resistance. These findings support the view that chemically induced mutants should be considered primarily as breeding resources for further hybridization and recombination, rather than as final products for direct release.

Overall, the study confirms that careful choice of genotype is essential if breeders wish to maximize the frequency of useful changes while limiting the occurrence of undesirable modifications. Despite the unavoidable constraints of mutation breeding, the results strongly support the use of responsive source material in combination with optimized DAB concentrations as an effective means of increasing trait-specific genetic diversity.

Among the varieties included in the experiment, Farell, Ronin, and Seilor proved to be the most valuable as breeding donors. They showed mutation-derived variability in plant architecture, developmental timing, and grain quality, including protein content and microelement composition. The likelihood of obtaining breeding-relevant material was clearly highest when DAB was applied at 0.3%, provided that the source genotype had been selected appropriately. Among the mutant derivatives, lines 89 and 100 were especially promising because they combined consistently high yield with grain quality at or above the target level, making them strong candidates for inclusion in state varietal testing.

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QUALITY PARAMETERS OF LOCAL WHEAT GENOTYPES CULTIVATED IN VARIOUS LOCATIONS IN SERBIA

Wheat (*Triticum aestivum* L.) is an ancient and widely cultivated food source integral to global diets. As whole-grain wheat increasingly features in diets, grain quality, influenced by breeding programs and production practices, becomes critical. Excessive intake of refined wheat products is associated with health risks, including obesity, type 2 diabetes, and coronary diseases. Refined flour's functional properties stem from its protein and starch content, which averages between 7–15% and 54–72%, respectively. In contrast, whole wheat flour retains beneficial minerals, dietary fibers, B vitamins, and phytochemicals, which promote health. The aleurone layer is rich in antioxidants, thereby preserving bioactive compounds as dietary fiber aids in their digestion and colon health. Test weight, protein content, and gluten characteristics are significant indicators of wheat quality, affecting cereal baking performance by influencing

dough properties. Proteins like gliadin and glutenin determine gluten's impact on texture and quality. The relative contributions of environmental and genetic factors (GxE) in wheat quality are essential for effective breeding strategies, as they help delineate conditions impacting yield and stress tolerance.

This research investigates the quality parameters of five local wheat genotypes across four locations in Serbia, focusing on their variability relative to similar geographic conditions. The aim was to determine which genotypes yield optimal quality parameters, thereby improving overall wheat quality and yield in the region.

This study utilized five winter bread wheat genotypes, namely four cultivars developed at the Maize Research Institute in Zemun Polje – 'Osatka', 'Zemunska rosa', 'Aurelija', and 'ZP Sara' – and one cultivar designated as 'Genotype 1' from an alternative producer. The examined genotypes were farmed in the 2024/2025 growing season using a randomized complete block design (RCB) with two replications. Each plot, consisting of 5 rows and measuring 1.0 m in length, was sowed with 250 seeds, with a spacing of 0.2 m between rows and plots. The sowing occurred in October at four sites in Serbia: Donja Trepča (Čačak municipality, Moravica District, 43.9136°N 20.4708°E); Sefkerin (Opovo municipality, South Banat District, Vojvodina, 45°00′10″N 20°28′35″E); Zemun Polje (Zemun municipality, Belgrade, 44°52′N 20°19′E); and Klenje (Bogatić municipality, Mačva District, 44°50′N 19°29′E). Standard cultivation procedures were employed to maintain the plots free from weeds and diseases while ensuring adequate nutrient supply for the plants. Standard laboratory protocols were used to evaluate grain test weight, chemical composition, and gluten content of whole-wheat flour.

The findings indicated considerable variation in chemical composition, gluten content, and test weight among genotypes and locations. The test weight for all samples ranged from 71.20 to 80.76 kg/hl, making them suitable for industrial use (≥73 kg/hl). However, only 65% of the samples met the quality standard for human consumption (≥76 kg/hl) established by Serbian regulations on grain quality, milling, bread products, and pasta. Gluten concentration varied from 20.9% to 43.8%. The cultivar 'Aurelija' from Donja Trepča had the highest starch content at 67.46% dry matter, while the cultivar 'Osatka' from Zemun Polje had the highest protein content at 16.04% dry matter. These findings indicate that both genotype and location significantly affect grain quality. Nonetheless, these quality parameters are considered high quality according to Serbian standards for cereal grains and products.

Through examination of the 'Zemunska Rosa' cultivar, it was discovered that there is a compelling interaction between environmental factors and key agricultural metrics, particularly test weight, which exhibits significant variation across locations. The importance of growing conditions in determining the overall quality of crops is highlighted by the fact that these conditions can vary. It is also important to note that the 'Osatka' cultivar exhibited significant variation in the amounts of protein and oil it contained, highlighting that external factors influence these characteristics. A further illustration of how environmental conditions can significantly impact nutritional quality is that 'Aurelia' stands out among the cultivars investigated for its remarkable variation in gluten content, which was found to be 18.94%.

Taken together, these findings highlight the critical need for crop breeders, farmers, and agronomists to consider local environmental factors when evaluating crop performance and quality. This will ultimately lead to more tailored cultivation practices that will optimize yields and enhance food security.

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SUBSTANTIATION OF YIELD STRUCTURE ELEMENTS AND TECHNOLOGICAL SUITABILITY OF CHICKPEA VARIETIES FOR MECHANIZED HARVESTING

Chickpea (*Cicer arietinum* L.) holds a significant position among grain legumes due to its unique combination of high drought resistance, atmospheric nitrogen fixation capacity, and high biological value of its seeds.

Given the global trend of climate aridity, chickpeas have become a strategic crop for diversifying agricultural production, enabling stable yields in regions with precipitation deficits. However, the realization of the genetic yield potential of chickpeas heavily depends on the correct variety selection, which must be adapted to the specific soil and climatic conditions of the region. Modern domestic and foreign genotypes differ in their growing season duration, resistance to abiotic stresses, and yield structure.

Studying the correlation between the weight of seeds per plant and the number of pods is of particular relevance, as it allows for the optimization of cultivation technology. Investigating the morphobiological parameters of different varieties is an essential stage in forming a varietal policy aimed at the sustainable development of the pulse sector. Furthermore, as a valuable predecessor, chickpeas contribute to improving soil fertility and increasing the overall profitability of crop rotations.

Special attention is given to the study of morphobiological markers of productivity, which allow for