

NUTRIENT MANAGEMENT PRACTICES FOR ENHANCING PRODUCTIVITY, NUTRITIONAL COMPOSITIONS, AND QUALITY IN DURUM WHEAT

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This study investigates the multifaceted impacts of genetic variation, nitrogen rate, foliarly applied zinc, and sulphur fertilizers on key agronomic and nutritional parameters of durum wheat. Through field experiments conducted for three consecutive years, various genetic variations, nitrogen rates, and combinations of zinc and sulphur applications were evaluated for their effects on protein content, hectoliter weight, yield metrics, and grain nutritional composition. Results reveal significant ($p < 0.001$) interactions between genetic backgrounds and nutrient management practices, highlighting the importance of tailored approaches for optimizing durum wheat production and quality. Increased nitrogen rates generally led to higher protein content but also influenced other yield metrics, emphasizing the need for balanced fertilization strategies. Applying a sulphur-containing fertilizer directly to the leaves during the flag leaf stage preserved the grain yield of drought sensitive varieties, such as Tamadur, while enhancing it by approximately 12.23% (from 4.8 to 5.4 t ha⁻¹) compared to tolerant varieties. Combined application of zinc and nitrogen resulted in an approximate 15.49% enhancement in grain zinc content and improved drought tolerance of durum wheat varieties (i.e. Duragold) by about 21.3%. This means that integrated nutrient management could exhibit nuanced effects on stress tolerance and grain nutritional composition, with potential implications for food quality and human health. This research universally underscores the complex interplay between genetic factors and agronomic practices in shaping the nutritional profile and productivity of durum wheat, providing valuable insights for sustainable crop management and breeding programs.