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EVALUATION OF DROUGHT STRESS IN WHEAT (*Triticum aestivum* L.) EXPOSED TO DROUGHT IN DIFFERENT PERIODS WITHIN THE PERSPECTIVE OF RETROTRANSPOSON-BASED GENETIC REGULATION AND ENZYMES

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Abstract

Drought is a significant factor in plant development and crop productivity. Therefore, this study focuses on investigating the impact of drought stress, which is particularly critical for Wheat (*Triticum aestivum* L.), the most important staple food for the global population. The study is designed to assess the extent of drought stress experienced by wheat during its growth stages and the importance of increasing soil water retention capacity to mitigate the stress caused by existing drought conditions. In the study, the first group of germinated wheat seedlings was subjected to drought stress during three different stages: seedling, growth, and filling periods. The other group of wheat seedlings received the addition of Natural Aquatic organic supplement to enhance soil water retention capacity and was subjected to the same drought stress conditions. At the end of the process, samples obtained from the applications were compared with control group samples grown without exposure to drought stress, in terms of their genetic stability and changes in antioxidant enzyme levels. The results of the Inter Retrotransposon Amplified Polymorphism marker analysis indicated that drought stress induces retrotransposon mobility, thereby affecting the genetic stability of wheat. Particularly, it was found that drought stress during the seedling stage is more effective compared to stress experienced in subsequent stages. Analysis results also revealed that drought stress alters the levels of Superoxide Dismutase, Catalase, and Malondialdehyde, with early-stage drought showing a more pronounced effect. Comparing the values of polymorphisms caused by retrotransposon mobility and genetic stability values between wheat samples exposed only to drought stress and those supplemented with Natural Aquatic organic addition to increase soil water retention capacity, it was evident that the addition mitigated drought stress. This was further supported by changes in Superoxide Dismutase, Catalase, and Malondialdehyde values. The study concluded that increasing soil water retention capacity or early-stage irrigation contributes to plant development and stability.

Key words: CAT, drought stress, IRAP, MDA, retrotransposon, SOD, wheat

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