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MAIZE RESPONSE TO ZINC APPLICATION UNDER DEFFERENT PHOSPHORUS FERTILIZATION LEVELS, ITS NUTRIENTS UBTAKE, AND AVAILABILTY IN ALLOUVIAL SOILS

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ABSTRACT

Two field experiments were conducted during two successive seasons 2006 and 2007 at the experimental farm of Sakha Agric. Rec. Station, Kafer El- Sheikh Government. The aim of this study was to investigate the influence of zinc addition 0, 10, and 20 Kg/ fad. For Zn_0(S) (control), Zn_{10}(S), and Zn_{20}(S), respectively or foliar application with or without urea, 2% urea [U(F)], 500 ppm Zn [Zn (F)] and 2% urea + 500 ppm Zn [U+ Zn (F)], respectively under different levels of phosphorus fertilization 30, 45, and 60 Kg P_2O_5 for P_1, P_2, and P_3 respectively on maize yield and its chemical composition. Ratherfore soil content of P , Zn , Fe, and Mn. The experiments were conducted in split plot design where P levels were the main plot and Zn treatments as were sub plot with four replicates.

The obtained results can be summarized as follows:

- The yield and its components of maize were significantly affected by P and Zn fertilizer treatments.
- Application of P_3 increased grain yield by 12.0 and 12.5% and biomass by 17.6 and 13.8 compared to control treatment (P_1) in 2006 and 2007 seasons.
- Soil application of 10 Kg zn / fad. under P_3 level gave the highest value of grain yield in the two seasons. and of the biomass in the first season, meanwhile [U+ Zn(F)] treatment gave the highest biomass value in the second season. While, the highest value of 1000 grain weight were obtained by [Zn_0 (S)] and [U+ Zn (F)] treatments in the two seasons.
- The maximum values of P maize grain content were obtained by Zn_{20}(S) treatment under P_3 and P_2 in the two seasons respectively.
- the maximum values of P maize stem content were obtained by [Zn_{10}(S)]and [Zn (F)] treatments under P_2 in the two seasons , respectively.
- The maximum values of zn maize grain content were obtained by [U+ Zn (F)] treatment under P_2 level, while [Zn (F)] treatment gave the maximum maize stem zn content under P_3 level in the two seasons.
- The maximum values of maize grain and stem Fe content were obtained by application of [U+ Zn(F)] treatment under P_1 level in the two seasons except grain in the first season. The same treatment also gave the maximum values of Mn of maize grain and stem under P_3 level except the stem in the first season.
- Translocation coefficient (TC%) of heavy metal from stem to grain can be arranged in the following decreasing sequence Zn > Mn> Fe.
- Available P, Fe, and Mn increased by increasing P fertilizer levels from P_1 to P_3, while available Zn increased by increasing P fertilizer levels from P_1 to P_2 but at P_3 it decreased.
- [U+ Zn (F)] treatment gave the highest available P, Fe, and Mn, while the highest available Zn was obtained by [Zn_{20}(S)] treatment.

Keywords: maize (*Zea maize* L.), phosphorus fertilizer, foliar application of Zn, and urea