



Effect of Soil and Foliar Application of Humic Acid on Growth and Yield of Grain Sorghum (*Sorghum bicolor* L Moench) Grown in Calcareous Soil under Different Levels of Phosphate Fertilizer

BY

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ABSTRACT

The current study was conducted to assess the main and interaction effects of humic acid with different levels of phosphate fertilizer on growth and productivity of Grain Sorghum {*Sorghum bicolor* (L) Moench} Grown in Calcareous Soil. Two field experiments were carried out consecutively at Tamiya experiment station Agric. Res. center (A.R.C), Fayoum Governorate Egypt, during the summer growing seasons 2019 and 2020. The experimental layout was a split- split plot arranged in randomized complete block design with four replications.

Phosphorus levels were arranged in the main plots ($P_{15}=100$, $P_{30}=200$ and $P_{45}=300$ P_{2O_5} kg/fed). While humic acid (H) was applied as soil application treatments randomly arranged in the sub plots; (0 (H_0), 10 (H_{10}) and 20 (H_{20}) kg/fed). Three foliar spraying of humic acid was (0 (F_0), 400 (F_1) and 800 (F_2) mg/L), arranged in the sub-sub plots.

At the vegetative growth results displayed that application of phosphorus fertilizers had a significant effect in all growth parameters. The best results were obtained by P_2 followed by P_3 treatments in terms of increasing growth parameters (plant height, number of leaves plant⁻¹, flag leaf area plant⁻¹, leaves and stem dry weight plant⁻¹) in both seasons at harvest compared with the other treatments. At harvest, the same results were found on yield attributes (plant height, panicle length, panicle diameter, panicle weight plant⁻¹, panicle grain weight plant⁻¹) and yield (biological yield ton fed.⁻¹, straw yield ton fed.⁻¹, panicle yield fed.⁻¹, grain yield fed.⁻¹ and shelling percentage (%).

Foliar spraying of humic acid (F_1) and (F_2) reflected positive significant influences on growth parameters, yield and its components in both seasons. F_2 followed by F_1 were the potent treatment for increasing growth parameters, yield and its components compared with control treatments (without humic acid).

The interaction effect between phosphorus levels and foliar spraying was significant in both seasons on growth parameters; yield and its components. The best

combinations were foliar spray F₂ combined with P₄₅ followed by P₃₀ which significantly increased growth characteristics, yield and its components.

There were no significant differences between P₄₅ and P₃₀ treatments in the most of studied traits especially in the grain yield. Therefore, under newly reclaimed soil condition such as in the current Egyptian situation, P₃₀ combined with H₂₀ could be considered a potential treatment for improving the growth and productivity of grain sorghum, with raising the percentage of organic matter in the soil by adding 20 Kg humic acid of as soil application.

Key Words: Sorghum, Phosphorus fertilizer, Humic acid, Vegetative growth, Yield.

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