

Effects of biological and chemical phosphorus fertilizers on growth analysis of maize S.C. 704 with different irrigation regimes

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Abstract

In order to study the influence of various irrigation regimes (drought stress), biological fertilizers (a combination of two Phosphate-solubilizing microorganisms) and different amounts of phosphorus fertilizers on some physiological indices of maize SC 704, a factorial split plot design in a completely randomized block design (RCBD) was conducted with three replications at the research field of Aboureihan Campus- Tehran University, Iran. The main plots were three irrigation regimes including 75, 100 and 125 mm (accumulative daily evaporation from the cap class A). The subplots were considered to be a mixture of the biological fertilizers in two levels (applied and non-applied) with triple superphosphate fertilizer in four levels including 0, 75, 150 and 225 kg/ha on factorial basis. The trends in the leaf area index, crop growth rate and relative growth rate were studied. By deviation from the optimal moisture and nutritional condition, a decrease in leaf area was caused to reduce crop growth rate and total dry matter in sever stress conditions (12 mm evaporation from the cap) and non-application of biological and chemical fertilizers. The maximum leaf area index (LAI) was observed in normal conditions at anthesis phase (LAI= 5.7), while it was lower at sever stress conditions (LAI= 3.14). In 12 fully expanded leaf stage, a similar increasing trend was observed with respect to leaf area index by applying 150 and 225 kg/ha chemical fertilizer, and it was significantly different from non-application of fertilizer. When biological fertilizer was applied alone, there were no significant differences in leaf area index.

Keywords: *Maize, Water stress, Phosphate-solubilizing bacteria, Triple superphosphate*