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# Physiological performance of maize genotypes under different inputs and density conditions

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## Abstract

Climate change and environmental variability affect plant growth whereas limiting resources is a major cause of yield loss for maize. The aim of this research was to investigate the ability of maize genotypes to utilize available inputs and improve productivity at a lower density after mycorrhizal inoculation. Ten commercial hybrids and three open pollinated lines ($HS_6$-21, $HS_6$-23 and C) were evaluated in two RCB experiments under normal irrigation and fertilization with 8.88 plants $m^{-2}$, and at 50% irrigation and fertilization with 5.33 plants $m^{-2}$ but with mycorrhizal inoculant. Chlorophyll content was measured at different growth stages while quantum yield and photosynthetic parameters (net photosynthesis, stomatal conductance, transpiration rate) at anthesis and physiological maturity. In most cases, measurements were affected strongly by genotype and not by the different treatments although in some parameters an interaction was observed. Line C did not differ with the best hybrids in all measurements of chlorophyll content under both regimes, while $HS_6$-23 was included in the best genotypes under low input conditions. $HS_6$-23 was among the superior genotypes at the first quantum yield measurement under both conditions but during the second one, no difference between the genotypes under all conditions was detected. Similarly, based on their photosynthetic performance, lines $HS_6$-23 and C were included among the best genotypes. Finally, the results of chlorophyll content and photosynthetic parameters at anthesis were strongly correlated with grain yield only under the normal input regime. The results of this research may elucidate maize plasticity and yield response.

**Keywords:** mycorrhiza inoculum, plant density, water limitation, corn lines, photosynthetic performance