

ANALYSIS OF THE FACTORS AFFECTING BIOMASS PRODUCTION OF COTTON CULTIVARS UNDER PHOSPHORUS DEFICIENCY STRESS

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ABSTRACT

The estimates of correlation coefficients and path coefficients can help understand the role and relative contribution of various plant traits in establishing growth behavior of crop genotypes under a given set of environmental conditions. Six cotton cultivars were allowed to grow in a sandy loam soil, deficient in NaHCO_3 -extractable P (4.1 mg P kg^{-1} soil) for 65 days after sowing in pot culture. Statistically significant positive correlations were observed between shoot dry weight (SDW) and some other plant traits such as root dry weight (RDW), leaf area per plant, P-uptake, and P-utilization efficiency (PUE), at both genotypic and phenotypic levels. The correlations of SDW with root:shoot ratio (RSR), however, were not statistically meaningful, implying that relative partitioning of biomass into roots or shoots had little role to play in SDW production by cotton cultivars under P-deficiency stress. Path coefficient analysis revealed that favorable impact of RDW and leaf area per plant on SDW production was indirect: through positive effect of these parameters on P-uptake and PUE. Thus under P-deficiency stress, better P-acquisition and efficient P-utilization by the efficient cultivars for biomass synthesis collectively formed the basis of higher SDW production by the efficient cultivars.