QUANTITATIVE CHARACTERIZATION OF LEAF GROWTH AND DEVELOPMENT OF MAIZE (*Zea mays* L.) IN RELATION TO DIFFERENTIAL PHOSPHORUS SUPPLY

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ABSTRACT

The specific objective of this study was to quantify and to separate the magnitude of effects of phosphorus deficiency on leaf growth and development of a maize plant. Maize varieties viz V_1 (EV 2097) and V2 (EV 3001) were grown in a sand culture. When the coleoptile leaf was fully expanded, three level of P supply i-e P_{Zero} 0.0 mM; P_{Med} = 0.5 mM and P_{Opt} = 1.0 mM were established by varying P concentration in the Long Ashton nutrient solution. The supply of respective nutrient media was maintained from coleoptile leaf stage through to silking. A thermal time in growing degree days (CGDD) was calculated to characterize the thermal environment of the corn plants. The leaf area was estimated daily non-destructively as one of the measures of growth of a maize plant. Number of leaves per plant, irrespective of a leaf size and the number of leaves per plant in Haun scale were used as one of measures of development of a plant and were also recorded on daily basis. The relationship between number of leaves (irrespective of size) or leaf number in Haun Scale and thermal time since sowing was found to be linear and was not impacted by phosphorus deficiency. The leaf appearance rate (measure of development) in V_1P_{Zero} and V_2P_{Zero} treatments was 24 and 36% slower than that in V_1P_{Opt} and V_2P_{Opt} treatments, respectively. The size of leaf area at silking stage in V_1P_{Zero} was 61 and 82% smaller than that in V_1P_{Med} and V_1P_{Opt} treatments, respectively. The leaf area in V_2P_{Zero} was 89% less than that of V_2P_{Med} and V_2P_{Opt} treatments. Variety (EV3001) was found more efficient in phosphorus utilization than EV 2097.

Key Words: Leaf area, Maize growth, Nutrient solution, Phosphorus deficiency.