

Growth and yield of hybrid maize [*Zea mays* (L.)] as influenced by plant density and fertilizer levels

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ABSTRACT

A field experiment was conducted at Tamil Nadu Agricultural University, Coimbatore during *kharif* 2007 to study the effect of plant density and fertilizer levels on the growth and yield of hybrid maize under irrigated condition. Two spacings *viz.*, 60 x 20 cm and 75 x 20 cm accommodating 83, 333 and 66, 666 plants ha⁻¹ were assigned to the mainplot. Three fertilizer levels *viz.*, 150:75:75, 200:100:100 and 250:125:125 NPK kg ha⁻¹ constituted the subplot treatments. The experiment was laid out in a split plot design with four replications. The results of the experiment revealed that among the spacing, normal spacing of 60 x 20 cm recorded taller plants, while wider spacing of 75 x 20 cm recorded higher LAI, DMP, number of leaves plant⁻¹, stem girth, yield attributes and yield. Application of 250:125:125 NPK kg ha⁻¹ recorded significantly better growth parameters and yield. However, the yield was comparable with 200:100:100 NPK kg ha⁻¹.

Key words : Hybrid maize, Spacing, Fertilizer levels, Growth, Yield.

INTRODUCTION

Maize [*Zea mays* (L.)] is one of the three most important cereals next to rice and wheat, in the world as well in India. It is one of the most versatile crops and can be grown in diverse environmental conditions and has diversified uses in human food and animal feed. It has got immense potential and is, therefore, called as “miracle crop” and also “queen of cereals”. Maize, being a C₄ plant is an efficient converter of absorbed nutrients into food. Maize is cultivated both in tropical and temperate regions of the world. In India, it occupies third place among the cereals after rice and wheat and is cultivated in an area of 7.59 million ha with a production of 14.71 million tonnes and the average productivity is 1938 kg ha⁻¹ (Anonymous, 2007).

The productivity of any crop is the ultimate result of its growth and development. The growth of any crop is determined mainly in terms of its plant height, number of functional leaves and dry matter. These growth parameters are affected by nutrition and extent of population density. Plant population is the prime factor for getting maximum yield. Plant population is decided by the inter and intra row spacing of crops. Optimum plant population for any crop varies considerably due to environment under which it is grown. It is not possible to recommend a generalized plant population since the crop is grown in different seasons with different management practices under varied environment.

Among the plant nutrients primary nutrients such as, nitrogen, phosphorus and potassium play a crucial role in deciding the growth and yield. Nitrogen is the most

deficient primary nutrient in Indian soils. The response of crops to nitrogen varies widely from place to place, depending upon the fertility level of soil and other environmental conditions. This necessitates the study on the response of crop to different levels of fertilizer. The use efficiency of applied nitrogen is only about 30 - 40 per cent (Parthipan, 2000). The nitrogen use efficiency can be improved with the use of hybrids, optimum plant population and application of nitrogen coinciding with peak need by the crop. Optimum nitrogen requirement will vary with plant population. Phosphorus is known to stimulate early and extensive development of root systems, which enables rapid maize growth and to mature early (Sankaran *et al.*, 2005). Maize has high yield potential and responds greatly to potassium fertilizer. Therefore, proper management of potassium nutrient is essential to realize maximum potential of the crop because it plays an important role in activating various enzymes (Tisdale *et al.*, 1990). Hence an attempt was therefore made to study the effect of different plant densities and fertilizer levels on growth and yield of hybrid maize during *kharif* season.

MATERIALS AND METHODS

An experiment was conducted during *kharif* 2007 at Tamil Nadu Agricultural University, Coimbatore to study the effect of different spacing and fertilizer levels on growth and yield of hybrid maize. The experiment was laid out in a Split Plot Design with four replications. Two spacings *viz.*, 60 x 20 cm (S₁) and 75 x 20 cm (S₂) accommodating 83, 333 and 66, 666 plants ha⁻¹ were assigned to the main plot. Three fertilizer levels *viz.*,

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