

Effect of Plant Density and Nitrogen Levels on Productivity and Economics of Rice Fallow Maize (*Zea mays*.L) under Zero Tillage Conditions

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ABSTRACT

A field experiment was conducted on clay loam soils of Agricultural College Farm, Bapatla during *rabi* 2009-10 and 2010-11 on maize under rice fallows. The treatments consisted of three planting densities (67000, 80000 and 100000 plants ha⁻¹) as main plots and four levels of nitrogen (120, 180, 240 and 300 kg N ha⁻¹) and were allotted to sub-plots. The experiment was laid in split-plot design and the treatments were replicated thrice. Plant growth parameters like plant height, dry matter accumulation, chlorophyll (SPAD readings) significantly influenced by both plant densities and levels of N application. Plant height and dry matter accumulation were significantly higher with 100000 plants ha⁻¹ than 67000 plants ha⁻¹ but was on a par with 80000 plants ha⁻¹. However, chlorophyll content, days to 50% tasseling and 50% silking were significantly higher at low planting density (67000 plants ha⁻¹) than higher planting densities of 80000 and 100000 plants ha⁻¹. Yield attributes (cob length, number of kernels cob⁻¹, kernel weight cob⁻¹, and shelling percentage) were significantly higher at lower planting density but kernel (79.3 and 81.7 q ha⁻¹) and stover yields (101.1 and 100.4 q ha⁻¹) were significantly higher at 100000 plants ha⁻¹ than that recorded with 67000 plants ha⁻¹ but was comparable with 80000 plants ha⁻¹. Harvest index was also higher with lower planting density of 67000 plants ha⁻¹(46.0 and 46.1%) than that recorded with higher level of planting density (100000 plants ha⁻¹) (43.9 and 44.8%). Nutrient uptake was significantly superior with higher level of planting density but soil fertility status reduced with increase in planting density from 67000 to 100000 plants ha⁻¹. Application of N significantly increased plant height, dry matter accumulation, chlorophyll content, yield attributes, yields net returns during both the years. The maximum kernel yield was recorded with application of 300 kg N ha⁻¹ (81.3 and 85.3 q ha⁻¹) but was on par with 240 kg N ha⁻¹ (77.5 and 79.0 q ha⁻¹). HI increased with increase in level of N from 120 (43.5 and 44.0%) to 300 kg N ha⁻¹ (46.4 and 46.7%). Net returns and benefit cost ratio (BCR) higher with higher planting density in combination with 300kg N ha⁻¹.

Key words : Chlorophyll (SPAD readings), Nutrient