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RESEARCH ARTICLE

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Evaluation of drip irrigation regimes and fertigation levels on yield of maize (*Zea mays* L.)

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ABSTRACT

Field experiments were conducted during 2007 - 2009 at Tamil Nadu Agricultural University, Coimbatore to study the effect of drip irrigation regimes and fertigation levels on yield of maize. The experiment was laid out in split plot design with three replications. The treatments included two irrigation regimes in main plot and eight fertigation levels in sub plot. In main plot, two irrigation regimes *viz.,* M_1 - Irrigation through drip at 75 per cent PE once in 3 days, M_2 - Irrigation through drip at 100 per cent PE once in 3 days were accommodated. The sub plot treatments consisted of eight fertigation levels *viz.,* S_1 - Drip fertigation with 75 per cent RDF (P as basal), S_2 - Drip fertigation with 100 per cent RDF (P as basal), S_3 - Drip fertigation with 125 per cent RDF (P as basal), S_4 - Drip fertigation with 150 per cent RDF (P as basal), S_5 - Drip fertigation with 75 per cent RDF with P through WSF (17:44:0), S_6 - Drip fertigation with 100 per cent RDF with P through WSF (17:44:0), S_7 - Drip fertigation with 125 per cent RDF with P through WSF (17:44:0) and S_8 - Drip fertigation with 150 per cent RDF with P through WSF (17:44:0). Control plots with surface irrigation at 0.80 IW / CPE ratio for maize with soil application of 100 per cent RDF were maintained separately for comparison. Drip irrigation at 100 % PE once in 3 days resulted in significantly higher grain yield of maize followed by irrigation at 75 % PE. Drip fertigation at 150 per cent RDF (225: 112.5: 112.5) with P through water soluble fertilizer registered significantly higher grain yield .Considering the high cost of water soluble fertilizers, drip irrigation at 100 per cent PE with fertigation level of 125 per cent RDF with P as basal could be an alternative option to realize a reasonably good yields in maize.

KEY WORDS : Drip fertigation, Drip irrigation, Water soluble fertilizer

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INTRODUCTION

Maize (*Zea mays* L.) is an important cereal crop of India and plays pivotal role in agricultural economy both as staple food for larger section of population, raw materials for industries and feed for animals. With intention of achieving evergreen revolution, intensive research in maize has been started anticipating its importance for food and feed. In India maize is grown in an area of 6.2 m.ha, with a production of 10.57 m.t and the average productivity is 1700 kg ha^{-1} . The present annual requirement of grain maize for different purposes is 12 m.t of which 4.5 m.t for poultry (Sounderarajan, 2002) with a gap of 1.5 m.t. In Tamil Nadu, maize is cultivated in an area of 0.20 m.ha. with a production of 0.24 m.t. with an average productivity of 1189 kg ha^{-1}. By 2020 AD, the requirement of maize for various sectors will be around 100 m.t, of which the poultry sector demand alone will be around 31m.t. (Seshaiah, 2000).

Drip irrigation holds promise in this respect (Narda and Lubana, 1999). Drip fertigation permits application of nutrients directly at the site of high concentration of active roots (Sivanappan *et al.,* 1987). Since nutrients are applied to a limited soil volume, the fertilizer use efficiency is also high. On the other hand, conventional fertilization especially on light soils may cause N losses through leaching and volatilization. Drip fertigation also enables accurate adjustment of water and nutrient supplies to meet the crop requirements and thus minimizing the loss of expensive nutrients which ultimately helps in improving productivity and quality of farm produce.

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MATERIALS AND METHODS

Field experiments were conducted during 2007 - 2009 at Tamil Nadu Agricultural University, Coimbatore to study the effect of drip irrigation regimes and fertigation levels