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Effect of different levels of NPK and Zn on yield and nutrient uptake of hybrid maize (COHM 5) (*Zea mays* L.) in Madhukkur (Mdk) series of soils of Tamil Nadu

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ABSTRACT

The study was undertaken to find out the nutrient optima for maximum yield and the nutrient removal by hybrid maize through balanced fertilization by a systematic approach on soil fertility evaluation. In nutrient sorption study, the nutrients *viz.*, phosphorus (P), potassium (K) and zinc (Zn) were found as limiting nutrients in these soils and these were considered as deficient nutrients. The optimum nutrient levels of NPK and Zn were fixed by sorption studies as 200: 70: 150 and 9.6 kg ha^{-1} for this soil series. Nitrogen level was fixed for optimum nutrient treatment at 200 kg ha^{-1} for this experimental soil series ($N_2P_2K_2Zn$) with a zero level and one below and one above this level of N were arrived. The field experiment was conducted at farmers' field with maize (COHM 5) as a test crop. The highest grain yield (7908 kg ha^{-1}) was recorded in the treatment with 250:70:150:9.6 kg of NPK and Zn ha^{-1}. The highest total N uptake (247.47 kg ha^{-1}) of maize in Madhukkur series was noticed in the treatment with 250:70:150:9.6 kg of NPK and Zn ha^{-1}. The application of 200:87.5:150:9.6 kg of NPK and Zn ha^{-1} resulted in the highest total P uptake (73.53 kg ha^{-1}). The highest total K uptake (207.42 kg ha^{-1}) was observed for the treatment of 200:64:187.5:4.8 kg of NPK and Zn ha^{-1}. The application of 250:70:150:9.6 kg of NPK and Zn ha^{-1} resulted in the highest total Zn uptake (1.516 kg ha^{-1}).

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Key words : Sorption study, ASI, Optimum nutrient treatment, Madhukkur, Soil series, Zea mays, Grain yield, Nutrient uptake

INTRODUCTION

Maize (*Zea mays* L.) is one of the third most important cereals, next to wheat and rice in the world as well as in India. Maize is a miracle crop called as "Queen of Cereals" and is grown in more than 130 countries. In Tamil Nadu maize is cultivated an area of 0.18 million hectares with a production of 0.29 million tonnes and an average productivity of 1552 kg ha^{-1} (Season and Crop Report, 2005). By 2020, the requirement of maize for various sectors will be around 100 million tonnes, of which poultry sector needs 31 million tonnes. Hence, it may be a very difficult task for us to increase the maize production from the present level of 34 to 100 million tonnes (Seshaiah, 2000). The concept of balanced fertilization paves the way for optimum plant nutrient supply to the full yield potential of crop and takes care of nutrient stress of soil. A systematic approach to soil fertility evaluation as proposed by Portch and Hunter (1988) envisages the optimization of fertilizer requirement for crop based on the nutrient sorption characteristics of soil. The present study is one such attempt to evolve fertilizer optima for hybrid maize (COHM 5) and to find out the uptake of nitrogen (N), phosphorus (P), potash (K) and zinc (Zn) in benchmark soil series of Madhukkur (Mdk) belongs to the order of Alfisol, which is one of the major maize growing soils in Tamil Nadu.

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