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Research Paper

Nitrogen management in rainfed maize

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ABSTRACT : Performance of a pre release maize hybrid DHM-115 was assessed by effecting changes in the application schedule of nitrogen fertilizer in eight different treatments including RDF during 2008 and 2009 *Kharif* seasons at Maize Research Centre, ARI, Rajendranagar, Hyderabad. The data revealed that T_5 treatment (Nitrogen @ 20 kg/ha at each rain in addition to a basal dose of 100 kg/ha) was significantly superior in terms of growth parameters like plant height, dry matter per plant, yield attributing characters like cob length, cob girth, number of rows per cob, number of seeds per row and 100 seed weight and cob, grain and stover yields and it was at par with T_4 treatment (Nitrogen in 2 splits (1/2 basal +1/2 at tasseling) during both the years and also in pooled data. The results clearly indicated that nitrogen requirement and its use varies significantly from hybrid to hybrid particularly under rainfed conditions and the blanket recommendations may not hold valid for all the hybrids.

Key Words : Maize hybrid, Nitrogen management, *Kharif,* Rainfed situation, Growth parameters, Yield attributes, Yield

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Maize (*Zea mays* L.) is the third most important cereal crop next to rice and wheat and has the highest production potential among the cereals (Muthu Kumar *et al*., 2005). The crop is mostly grown under rainfed situations during *Khairf* season and hence the productivity is largely dependent on its nutrient management. Nitrogen is universally deficient in majority of Indian soils and has beneficial effect on growth, yield and yield attributing characters of maize (Singh *et al*., 2000 and Thind *et al.*, 2002). Application of N fertilizer has been effective for increasing crop production (Manuel *et al.*, 2000), especially in the rainfed cropping systems in arid and semiarid areas (Dang, 1999; Zhang *et al.*, 1994).

Therefore, it is very much essential not only to standardize the nitrogen requirement of any newly developed hybrid but also to assess its use efficiency particularly when the technology is meant for rainfed conditions. It is with this objective that the present study was conducted and the results of the same are discussed in this paper.

Research Procedure

The field experiment was carried out in a randomized block design with 8 treatments at Maize Research Centre, Agricultural Research Institute, Rajendranagar, Hyderabad during *Kharif* seasons of 2008 and 2009 under rainfed situation. The treatments were T_1- RDF(2/3rd basal+1/3rd at 30-40 DAS), T_2-N in 3 splits (1/2 basal+1/4th at kneehigh+1/4th at tasseling), T_3-N in 3 splits (1/3rd basal +1/3rd at kneehigh+1/3rd at tasseling), T_4- N in 2 splits (1/2 basal +1/2 at tasseling), T_5-N@ 20 kg/ha at each rain in addition to a basal dose of 100 kg/ha, T_6-T_1+Foliar spray of urea@2%, T_7-T_1+foliar spray of KNO_3 @1% , T_8-T_1 + K in 2 splits(1/2 basal + 1/2 at tasseling). Short duration pre-release maize hybrid DHM-115 was used in the experiment. The soil of the experimental field was low in organic carbon (0.38%) and available N (255.7 kg ha^{-1}), medium in available P (23.4 kg ha^{-1}) and high in available K (156.7 kg ha^{-1}) contents with clay loam in texture and slightly alkaline with a pH of 7.8 during both the years. A total precipitation of 855 mm in 36 rainy days was received during 2008 *Kharif* season, while it was 505 mm in 27 rainy days during 2009 season. The recommended dose of fertilizer was 180-60-50 kg N, P_2O_5 and K_2O/ ha. Nitrogen was given as per the treatments except in T_5. In T_5 nitrogen was applied with every rain keeping a minimum interval of 10 days. Likewise 5 splits of nitrogen were given during 2008 and 6 splits were given during 2009. Thus, through this treatment a total nitrogen of 200 and 220 kg/ha was given during 2008 and 2009, respectively. P_2O_5 @ 60 kg/ha was applied as basal at the time of sowing. K_2O was applied basally except in T_8 treatment. The crop was planted as per the inter and intra row spacing (75x20 cm) to have desired population by hand dibbling @ 2