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Effect of integrated nitrogen managment in maize (*Zea mays* L) on pattern of leaf area and dry matter production

P. M. CHAUDHARI*, H. E. PATIL[1] AND R. H. HANKARE
Department of Agronomy, College of Agriculture, MPKV, Dhule-424 004 (India)
[1] Department of Agronomy, Anand Agricultural University, Anand - 388 110.

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SUMMARY

The application of 120 kg N ha^{-1} to maize, ¼ though different organic manures + ¾ through urea + BNF significantly increased the leaf area and dry matter production resulting in significant improvement in grain and dry fodder yield than application of 40 and 80 kg N ha^{-1}, ¼ through different organic sources + ¾ through urea + BNF. It would be therefore, avisable to fertilize maize with 120 kg N ha^{-1}, ¼ applied through organic sources + ¾ through urea + BNF.

Key words: Maize, leaf area, dry matter, urea, vermicompost and BNF.

Maize is gaining importance now a day, as a food crop in India. Besides its importance as a food grain crop, maize has a significant commercial importance in the Indian economy, as it is used as a raw material for developing industries like manufacture of starch, syrup, alcohol, glucose, paper adhesives, synthetic rubber, resin, acetic acid and lactic acid etc., the demand for which is increasing day by day. Maize also serve as a fodder crop for cattle.

The vegetative crop growth has a direct bearing on the reproductive phase. Thus, the economical yields are the results of leaf area production and dry matter accumulation in the plant. It is therefore, necessary to study the leaf area production and dry matter accumulation pattern to analyse the yield on logical basis. Chowdhary and Rosario (1992) reported that the functional leaves, plant height, dry matter and leaf area per plant increased significantly with increased levels of nitrogen application. Nanjundappa *et al.*, (1994) observed that an application of 150 kg N ha-1 gave significant increase in dry matter production of maize. However, the information on leaf area and dry matter production and economical yield by integrated nitrogen management in maize a heavy feeder crop is very meager and to stabilize the productivity and maintain and improve soil health the basic research on various sources of organic fertilizers application to maize need scientific inquest.

MATERIALS AND METHODS

The field experiment was conducted in randomized block design with three replications at the Agriculture College Farm, Pune during *Kharif* (1999). Ten treatments like 120 kg N ha^{-1} alone, 40 kg N ha^{-1} through ¼ FYM + ¾ urea + BNF, 40 kg N ha^{-1} through ¼ compost + ¾ urea + BNF, 40 kg N ha^{-1} through ¼ vermi-compost + ¾ urea + BNF, 80 kg N ha^{-1} through ¼ compost + ¾ urea + BNF, 80 kg N ha^{-1} through ¼ vermi-compost + ¾ urea + BNF, 120 kg N ha^{-1} through ¼ FYM + ¾ urea + BNF, 120 kg N ha^{-1} through ¼ compost + ¾ urea + BNF and 120 kg N ha^{-1} through ¼ vermi-compost + ¾ urea + BNF were given to maize in *Kharif*. The maize variety Deccan Double Hybrid-103 was dibbled on June 24, 1999. Maize seed were treated with Biological Nitrogen Fixer (BNF), comprising of Acetobacter, Azotobacter and Azospirillum applied at the time of sowing for better nodulation. N was applied through four different sources such as urea, FYM, compost, and vermi-compost containing 46.40, 0.53, 0.56 and 0.65% N. A basal dose of 60 kg P_2O_5 and K_2O was applied at sowing. The optimum plant population was maintained by gap filling on 10th day and by thinning on the 20th day after dibbling, keeping one healthy seedling per hill.

The gross and net plot sizes were 4.50x13.50 m^2 and 3.00 x 12.90 m2, respectively. The soil of experimental field was clay in texture, vertisol in nature and uniform in depth up to 60 cm. It was low in available N (265 kg N ha^{-1}), medium in available phosphorus (27.12 kg P_2O_5 ha^{-1}) and high in available potassium (391 kg K_2O ha^{-1}) and slightly alkaline in reaction (pH 7.5).

The total rainfall of 500 mm was received in 38 rainy days. However, two irrigations were given during long brake of monsoon. Hence, no moisture stress was experienced during the crop growth period. In general, weather conditions were quite favorable for growth and development of maize crop and satisfactory grain yield.

The leaf area and dry matter plant^{-1} was recorded at an interval of 14 days from 28 days after sowing onwards. For these studies two plants were selected randomly from each net plot. The above ground plant parts were used for dry matter studies. The dry matter accumulation in various parts were recorded, but

*Author for correspondence