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YIELD TARGETING IN SEASONAL SUGARCANE BY CONJOINT USE OF CHEMICAL FERTILIZERS AND ORGANIC MANURES

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ABSTRACT

Four artificial fertility gradients were prepared using graded doses of fertilizers (Ramamoorthy *et al.*, 1967) and maize was taken as an exhaust crop to bring the soil into equilibrium conditions. After harvest of the maize crop, four FYM blocks were prepared across these gradients using 0, 10 and 20 Mg ha^{-1} FYM levels and these blocks were sub divided in to 24 treatment plots in which 20 treatment combinations and 4 control treatments were superimposed for sugarcane crop. Treatment wise sugarcane yield was recorded and cane and leaf top samples were analysed for NPK nutrient concentration. Based on these observations, basic parameters viz., nutrient requirement (NR) kg Mg^{-1}, per cent contribution from soil (% CS) and per cent contribution from fertilizers (% CF) and FYM were worked out. These parameters were used to formulate fertilizer prescription equations with and without FYM. The validity of the equations was tested in follow-up trials and all the yield targets of seasonal sugarcane were achieved.

Key words : Fertilizer prescription equations, Yield targeting, NR kg Mg^{-1} , %CS, % CF.

In recent years, the concept of integrated nutrient supply involving combined use of organic and inorganic fertilizers has gained much empatous which also ensures optimum growth conditions under intensive cropping systems using high yielding varieties. Ramamoorthy *et al.* (1967) established a theoritical experimental basis for making scientific fertilizer recommendations on soil test crop response. Ramamoorthy and Velayutham (1971) found this approach to be a useful tool for fertilizer recommendations. In yield targeting equations previously, there was only consideration of inorganic sources for fertilizer recommendations, however, an attempt is made to involve both sources i.e. inorganic and organic fertilizers in deriving fertilizer prescription equation for sustained production.

MATERIALS AND METHODS

A main experiment on seasonal sugarcane was conducted at M.P.K.V., Rahuri on Typic Haplusterts of Otur series in the year 1996, using the fertility gradient approach. The field was divided into four equal strips in which four fertility gradients were artificially created by applying graded doses of N, P and K fertilizers (Dev *et al.*, 1978). Maize was grown as an exhaust crop on these strips to stabilize the soil nutrients. The maize crop was harvested and the field was again divided into four equal FYM blocks across the fertility gradient. Each FYM main plot was subdivided into 24 equal plots, and initial soil samples were drawn from each plot and analysed for available N, P, K (Jackson, 1973). FYM treatments of 0, 10 and 20 Mg ha^{-1} were given to the FYM blocks in which 0 Mg ha^{-1} treatment was repeated twice. Seasonal sugarcane was planted as a test crop and 20 treatment combinations and four control plots were superimposed in the 24 plots. After harvest of the sugarcane crop, the yield per plot in Mg ha^{-1} was noted, and cane and top samples were analysed for N, P and K (Parkinson and Allen, 1975 and Jackson, 1973). From the cane yield, nutrient uptake, initial soil test values and fertilizer doses applied, the basic parameters viz., nutrient requirement (NR), per cent contribution from soil (% CS) and per cent contribution from fertilizer (% CF) were calculated, and using these basic parameters the fertilizer prescription equations were developed for seasonal sugarcane (Dev *et al.*, 1978).

To test the validity of the fertilizer prescription equations, follow-up trials were conducted in the year 1998-99 on Typic Haplusterts of Otur series and the yield targets were compared with absolute control and recommended doses of sugarcane.

RESULTS AND DISCUSSION

In this investigation, seasonal sugarcane required 1.44 kg N, 1.12 kg P_2O_5 and 1.62 kg K_2O to produce one Mg of cane. The contribution from soil was 50.08, 252.0