

SOIL FERTILITY DYNAMICS AS INFLUENCED BY CROPPING SYSTEM AND FERTILIZER LEVELS

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ABSTRACT

The experiments were conducted at Sorghum Research Station, Marathwada Agricultural University, Parbhani with the objectives to study the residual effect of *kharif* legumes on the succeeding *rabi* sorghum SPV-655 crop. The data indicated that the highest build up of nitrogen was observed in soybean JS-335 followed by green gram the preceding crop of black gram also proved beneficial in case of phosphorus status green gram noted the highest build up followed by soybean JS-335 and black gram. The soil fertility status after harvest of *rabi* sorghum was also influenced by preceding crops. Soybean JS-335-*rabi* sorghum showed the highest nitrogen gain followed by soybean MAUS-47-*rabi*-sorghum, black gram-*rabi* sorghum and green gram-*rabi*-sorghum, respectively. All these preceding crops resulted into the negative balance of phosphorus after the harvest of *rabi* sorghum the net negative balance of phosphorus was highest in black gram-*rabi* sorghum sequence. The maximum gain of potassium was in soybean JS-335-*rabi* sorghum followed by green gram-*rabi* sorghum in general fertilizer application increased the nitrogen and phosphorus status after harvest of legumes while there was depletion of potassium. Fertilizer application did not show definite trend in nitrogen after the harvest of *rabi* sorghum.

Key words : Cropping sequence, Nutrient status.

The need of fertilizer in cropping system mainly depend upon the characteristics of preceding crops and kind and quantities of fertilizers applied to them. Inclusion of legumes in crop sequence helps in improving the soil fertility resulting in higher yield of succeeding crops as compared to preceding exhaustive cereal crops. Capacity of various crops to utilise native, as well as applied nutrients, vary considerably, which ultimately influence the residual effect of applied nutrients on the succeeding crop. Among the various cereal crops, exhaustive crop of sorghum millet impoverishes soil much more than crop of maize. Sadanandan and Mahapatra (1973) observed negative balance of nitrogen in all multiple cropping systems, but the extent of deficiency was less in groundnut-Jute-rice rotation. The legumes are capable of fixing atmospheric nitrogen to the maximum extent. Incorporation of legume like soybean has proved its importance by increasing the grain yield of cereals. Beneficial effect of preceding legumes on grain yield of wheat has been reported by many workers.

MATERIALS AND METHODS

The experiment was carried out at Sorghum Research Station, Marathwada Agril. Univ., Parbhani

during *kharif* and *rabi* seasons of 2004-2005. The soil of the experimental field was of Typic Haplusters (Vertisol) of Parbhani series. The textural class was clayey with 260.6, 18.7 and 686.0 kg ha⁻¹ available nitrogen, phosphorus and potassium, respectively with pH 7.7. The experiment was laid out in Factorial Randomized Block Design with 36 plots replicated thrice. The treatments consisted of preceding four legumes (Green gram-BM-4, Black gram-TAU-1, soybean-MAUS-47 and soybean-JS-335 and three fertilizer levels to *rabi* sorghum SPV-655 (0, 50 and 100 % RDF) having total twelve treatment combinations. The seeds of green gram and black gram were dibbled at 30 × 10 cm, while the soybean was sown at 30 × 10.5 cm. *Rabi* sorghum SPV-655 was sown at 45 × 15 cm. The observations regarding soil fertility status after legumes, as well as *rabi* sorghum were recorded after harvest of crops. The data thus obtained were analysed statistically by following standard procedures.

The data regarding initial nutrient status, after harvest of legumes as well as after harvest of *rabi*-sorghum are presented in Table 1.

RESULTS AND DISCUSSION

Effect of preceding legumes on soil fertility status :

The fertility status of soil after legumes was very much improved due to the preceding leguminous crop.