Effect of different levels of phosphorus and potassium on summer groundnut (*Arachis hypogaea* L.)

Y.V. SALVE AND B.S. GUNJAL*

Department of Agronomy, College of Agriculture, DHULE (M.S.) INDIA

ABSTRACT

Application of 50 and 75 kg P_2O_5 ha^{-1} to groundnut were at par with each other but significantly increased plant height, spread, number and weight of matured pods $plant^{-1}$, 100 kernal weight, dry pod and haulm yields, protein and oil content and their yields as compared to application of 75 kg P_2O_5 ha^{-1}. The dry matter production $plant^{-1}$ and uptake of NPK significantly increased with each additional level of phosphorus fertilization. The application of 30 and 45 kg K_2O ha^{-1} were found to be at par with each other but significantly increased number of branches $plant^{-1}$, dry matter production $plant^{-1}$, root nodules and their weight $plant^{-1}$ at flowering and pod development stages, protein and oil content in kernal and their yields as compared to application of 15 kg P_2O_5 ha^{-1}. However, application of potassium did not influence yield attributes, dry pod and haulm yields and protein and oil yields. Uptake of N, P and K significantly increased with the increased levels of potassium fertilization.

Key words : Summer groundnut, Growth, Nodulation, Yield, Quality, Nutrient uptake

INTRODUCTION

Fertilization played a vital role in increasing the productivity of crop even after green revolution. Though India occupies unique position in the area and production of oilseeds, judicious fertilizer management plays a pivotal role in influencing the crop yield significantly.

Phosphorus stimulates root formulation, growth and increases nitrogen fixation (More *et al.* 2002), mainly it aids in nodule formation and increases the protein and mineral content in groundnut kernel. Potassium is known for its ability to increase yield and improve quality. It is also essential for photosynthesis and pod development in groundnut (Burkhart and Collins, 1941). Thus, there is ample scope for increasing production through use of these nutrient elements. Keeping this in view, an investigation was carried out with an objective to know the effect of phosphorus and potassium on plant growth, yields attributes and yield in groundnut.

MATERIALS AND METHODS

A field experiment was conducted during summer season of 2007 at the Post Graduate Institute Research Farm, MPKV, Rahuri. The soil of the experimental field was clayey in texture. The chemical composition refected that the soil was slightly alkaline in reaction (pH 8.1) with low in available nitrogen (183.76 kg ha^{-1}), medium in available phosphorus (19.92 kg P_2O_5 ha^{-1}) and high in available potassium (398.60 kg K_2O ha^{-1}). The experiment was laid out in a factorial randomized block design with nine treatment combinations along with one control and replicated three times. The gross and net plot sizes were 6.00 m x 4.80 m and 5.60 m x 4.20 m, respectively. Single super phosphate and muriate of potash were the sources of phosphorus and potash, respectively. Full amount of P and K according to treatments was applied at the time of sowing. The uniform application of nitrogen @ 25 kg ha^{-1} as basal dose through urea + 10 t FYM ha^{-1} was applied to groundnut cv. TAG-24. The crop was dibbled on 26th February, 2007 at 30 x 10 cm spacing. Groundnut kernels were treated with PSB and *Rhizobium* culture. The observations on growth parameters and root nodules were recorded periodically and yield contributing characters and yield at harvest.

The nitrogen content in kernel and haulm was estimated by Microkjeldhal method (A.O.A.C., 2002), phosphorus content by calorimetric method (Jackson, 1973) and potassium content by flame photometer method (Hanway and Heidal, 1967). Protein content was estimated by multiplying nitrogen content by 5.46. The oil content was estimated by Soxhlet Ether Extract method (A.O.A.C., 2002). The uptake of N,P and K was calculated by multiplying yield of kernel and haulm with their respective N, P and K per cent.

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* Author for correspondence.