

Interaction effect of sulphur and phosphorus application on yield and major nutrient composition of soybean (*Glycine max* L. Merrill) grown on alfisol

A.K. PALIWAL, S.K. VAJPAI AND KIRAN VAJPAI

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See end of the article for authors' affiliations

Correspondence to :

A.K. PALIWAL
RMD College of
Agriculture and Research
Station, AMBIKAPUR
(C.G.)INDIA

ABSTRACT

A field trial was carried out to evaluate the effect of sulphur and phosphorus application on yield and N, P and K contents of soybean grown on alfisol. It was found that increasing application of sulphur and phosphorus, singly as well as in combination, significantly increased the grain yield and contents of N, P and K upto $S_{40}P_{60}$ level over control. The interaction of S x P exhibited a strong synergistic relationship in soybean nutrition grown on deficient soil.

Key words : Soybean, Interaction effect, Sulphur and phosphorus application

Food legumes are the inseparable part of Indian diet especially as a source of protein for vegetarian masses. Soybean (*Glycine max* L. Merrill) is an important leguminous and oilseed crop of *kharif* season, which is cultivated over a wide range of climatic conditions in various states of the country. Cultivation of soybean, is also gaining popularity in Chhattisgarh due to its higher nutritive value and yield potential than other legumes. The nutritional importance of soybean is primarily due to high content of edible grade protein and oil. Besides, it is also a rich source of energy, essential minerals and certain vitamins. In northern hill region of Chhattisgarh, among the major constraints in production of soybean one is the inherent poor fertility status of the soil and imbalanced use of fertilizers, which results in severe nutritional deficiencies, poor growth and ultimately yield of the crop. The soils of this region are light textured and deficient in available sulphur and phosphorus because of high P fixing capacity, use of S-free high analysis fertilizers and intensive cropping. The soils of Chhattisgarh have been reported deficient in sulphur (Tandon and Messick, 2002). Soybean, being a leguminous and oilseed crop has higher requirement of sulphur and phosphorus, hence it is known to respond to S and P fertilization. Among the various factors contributing towards the attainment of potential growth, yield and quality of soybean, mineral nutrition especially sulphur and phosphorus are of considerable practical importance. The information on the response of soybean to S and P is very limited in this region. Therefore, the present investigation was undertaken to evaluate the effect of S and P interaction on yield and nutrient composition of soybean grown on S and P deficient alfisol.

MATERIALS AND METHODS

A field experiment was conducted during *kharif* (rainy) season 2004 and 2005 on alfisol soil of RMD College of Agriculture and Research Station, Ambikapur, (Chhattisgarh) having sandy loam texture, pH 5.7, organic carbon 0.32%, available nitrogen 190 kg/ha, available phosphorus 8.2 kg/ha, available potassium 270 kg/ha and available sulphur 6.4 kg/ha. Sulphur was applied @ 0, 20, 40 and 60 kg S/ha through elemental sulphur and phosphorus was applied @ 0, 40, 60 and 80 kg P_2O_5 /ha through diammonium phosphate. A basal dose of nitrogen @ 30 kg N/ha and potassium @ 20 kg K_2O /ha in the form of urea and muriate of potash, respectively, was applied as common to all the plots. The experiment was laidout in factorial randomized block design with three replications. The plot size was 4.5 x 4.0 m² for each treatment. The soybean variety Indira Soya-9 was sown as the test crop, following the recommended package of practices in last week of June 2004 and first week of July 2005, respectively. Grain and straw samples were collected at the time of harvesting. Samples were oven dried and ground to powder form for chemical analysis. Nitrogen content in plant samples was determined by micro-kjeldahl's method as described by Piper (1967), phosphorus content was determined by Vanado-molybdo-phosphoric acid yellow colour method using photoelectric colorimeter with blue filter (Koenig and Johnson, 1942) and potassium content was determined by Flame-photometer (Chapman and Pratt, 1961). The pooled data over two years on grain yield, N, P and K contents were analyzed statistically.