

Effect of sulphur and phosphorus on yield and quality of soybean

M.B. IJGUDE AND J.R. KADAM

See end of the article for
authors' affiliations
.....

Correspondence to :

J.R. KADAM

Department of Soil Science
and Agricultural Chemistry,
Mahatma Phule Krishi
Vidyapeeth, Rahuri,
Ahmednagar (M.S.) INDIA

Accepted : April, 2008
.....

ABSTRACT

A field experiment was conducted at Post Graduate Institute Farm during *kharif*, 2005 with a view to study the effect of sulphur and phosphorus on yield and quality of soybean (*Phule kalyani*) in Inceptisol (*Vertic haplustept*). From the experiment it was emerged out that application of 40 kg S and 100 Kg P₂O₅ ha⁻¹ recorded highest grain and straw yield, oil content and crude protein content of soybean. The combined application of 40 kg S ha⁻¹ and 75 kg P₂O₅ ha⁻¹ proved to be the best combination resulting in significant increase in grain and straw yield, oil and crude protein content.

Key words : Sulphur, Phosphorus, Yield, Quality, Soybean.

Production of oil seeds and pulses in recent years has fallen short of the requirement due to a number of reasons. Sulphur and phosphorus play a vital role in the production of oil seeds and puke crops. Our soils have become hungry in these plant nutrients. The interaction of these nutrient elements may affect the critical level of available P and S below which responses to their application could be observed. The present experiment was designed to study the effect of S and P on yield and quality of soybean.

MATERIALS AND METHODS

A field experiment was conducted in medium black soil having shrink and swell property. The experimental field was with moderate drainage and characterized by clayey texture, moderately alkaline, low in available nitrogen and phosphorus, high in potassium and medium in sulphur.

The experiment was laid out in a factorial randomized block design with two replications and sixteen treatments having four levels of each of S (0, 20, 30 and 40 kg ha⁻¹) and phosphorus (0, 50, 75, 100 Kg ha⁻¹) applied through elemental sulphur and diammonium phosphate, respectively. A basal dose of 50 kg N ha⁻¹ through urea was applied uniformly with the treatments. The soybean seed *Phule kalyani* (DS-228) was sown @ 75 kg ha⁻¹. The treatment effects were evaluated in terms of grain and straw yield and quality of soybean. Available N was determined by alkaline permanganate method (Subbiah and Asija, 1956). Crude protein content of soybean was estimated by multiplying per cent nitrogen of grain with

factor 5.70 and oil content was determined by Soxhlet extractor method (Piper, 1966).

RESULTS AND DISCUSSION

Grain and straw yield:

Increasing levels of S significantly increased the grain and straw yield. Application of P in the absence of added S on an average, increased the grain and straw yield up to 100 kg P₂O₅ ha⁻¹ (Table 1). The highest grain (22.21q ha⁻¹) and straw (27.38 q ha⁻¹) was observed with the application of 100 kg P₂O₅ ha⁻¹. As the level of S increased from 0 to 40 kg ha⁻¹, grain and straw yield also increased significantly. Nimje and Potkile (1998) and Wastmatar *et al.* (2002) have also reported S and P responses. The combined application of P and S resulted into significant interaction. The significant increase in grain and straw yield was observed when 40 kg S ha⁻¹ was applied in combination with 75 kg P₂O₅ ha⁻¹.

Oil content:

The increasing levels of sulphur significantly increased the oil content upto 40 kg S ha⁻¹. The highest oil content of 21.30% was recorded due to the application of 40 kg S ha⁻¹ whereas with phosphorus addition oil content increased upto 100 kg ha⁻¹. The highest oil content (20.20%) were recorded due to the application of 100 kg P₂O₅ ha⁻¹. Similar results was reported by Dwivedi and Bapat (1998) and Varavipour *et al.* (1999). The highest oil content (21.52%) was obtained with combined application of 40 kg S and 75 kg P₂O₅ ha⁻¹ (Table 2).

Crude protein content:

The increasing levels of sulphur significantly