

**Effect of different levels of rock phosphate with cattle
manure on growth and seed yield of
soybean (*Glycine max*) in sandy regosol**

Piraveena Sithambaram



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ABSTRACT

A field experiment was carried out in 2010/2011 at the Agronomy farm, Eastern University of Sri Lanka to identify the effect of different levels of rock phosphate (0-100 kg/ha) with cattle manure (10 ton/ha) on plant performance of soybean (*Glycin max* L. Merrill) which is an important pulse crop and also is a high nutritive crop produced world wide. The experiment was laid out in a Randomized Complete Block Design with six treatments to evaluate the growth and seed yield of soybean. As basal fertilizer application, different levels of rock phosphate (0, 25, 50, 75 and 100 kg/ha) in combination with cattle manure (10 t/ha) were applied before two weeks of planting and recommended chemical fertilizers (50 kg/ha urea, 150 kg/ha tripple super phosphate and 75 kg/ha muriate of potash) were also applied two days before planting as control. Four weeks after planting, 50 kg/ha urea was applied as topdressing to the all plots. Other agronomic practices were followed as recommended by Department of Agriculture, Sri Lanka. Plants were uprooted every two weeks interval from each treatment and agronomic parameters were measured. All the collected data were analyzed with the statistical package of SAS and mean treatments were compared by using Tukey's Studentized Range (HSD) Test at 5% significant level.

The results showed that the significantly highest ($P < 0.01$) mean number of pods and shoot: root ratio were achieved at cattle manure (10 t/ha) with 50 kg/ha rock phosphate at different growing stages. Results also revealed that canopy height, numbers of branches per plant, number of total nodules per plant, number of leaves per plant and root length were increased with increased rate of phosphate application at different growing stages. The highest mean values of fresh and dry weights of

leaves, root, shoot and pods per plant were recorded with cattle manure with 50 kg/ha rock phosphate which was significantly superior to all the other treatments at different growing stages. Number of effective nodules was significantly increasing with increased rate of phosphate application after 6th week. Fresh and dry weights of plant were increased at the optimum rate (50 kg /ha) of phosphate application. And also the optimum level of rock phosphate application significantly increased the fresh weight and dry matter yield of pods. Significant variation ($P<0.01$) was observed in pod number, and pod dry weight at harvesting stage. Highest mean value was recorded in cattle manure with 50 kg/ha rock phosphate for pod number (41.9), and pod dry weight (16.92g). Maximum seed yield (4.21 ± 0.08 ton/ha) was recorded in 50kg/ha rock phosphate with cattle manure followed by control (4.10 ± 0.06 ton/ha). Optimum level of phosphate application was increased pod number, pod dry weight pod length and seed dry weight. This was resulted significantly highest values ($P<0.01$) of biological and economical yield in the application of rock phosphate at the rate of 50 kg/ha with cattle manure.

The cattle manure (10 t/ha) with 50 kg/ha Rock phosphate exhibited a better vegetative and reproductive performance in the present experiment. Based on the experimental results, it could be concluded that 50 kg/ha rock phosphate with cattle manure (10 t/ha) application is an appropriate substitute to recommended fertilizers to achieve better vegetative growth and maximum seed yield and this is the optimum level for consideration from this experiment.