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THE EFFECT OF PHOSPHORUS LEVELS, CULTIVARS AND PLANT POPULATION ON COWPEA YIELD

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Cowpea (*Vigna unguiculata* L. Walp.) is this most important subsistence food crop for the people of north and northeast Brazil. Very little information is available regarding doses of phosphorus fertilizer, cultivars and plant density. Therefore, the objective of this study was to determine the effects of these production factors on cowpea yield.

Two field experiments were conducted at the National Rice and Bean Research Center, Capivara Farm, from October to March, 1982. The soil type in the experimental fields was a dark red latossol (oxissol). Chemical analysis showed this soil to contain 2.1 ppm phosphorus, 23 ppm potassium, 2.7 meq/100 g calcium plus magnesium, 1.7% organic matter, 0.8 meq/100 g aluminum and a pH of 5.3.

The treatments consisted of four levels of phosphorus (40, 80, 160 and 320 kg P_2O_5/ha as simple superphosphate), three cultivars (Seridó, Ipean V-69 and 4 R-0267-IF) and four plant populations (80,000, 160,000, 240,000 and 320,000 plants/ha). All plots received 20 kg/ha as ammonium sulphate and 30 kg K_2O/ha as potassium chloride at the time of planting. A randomized block experimental design was used with four replicates with the treatments being combined in a factorial arrangement. Planting were made in rows 50 cm apart, with 10 seeds per linear meter.

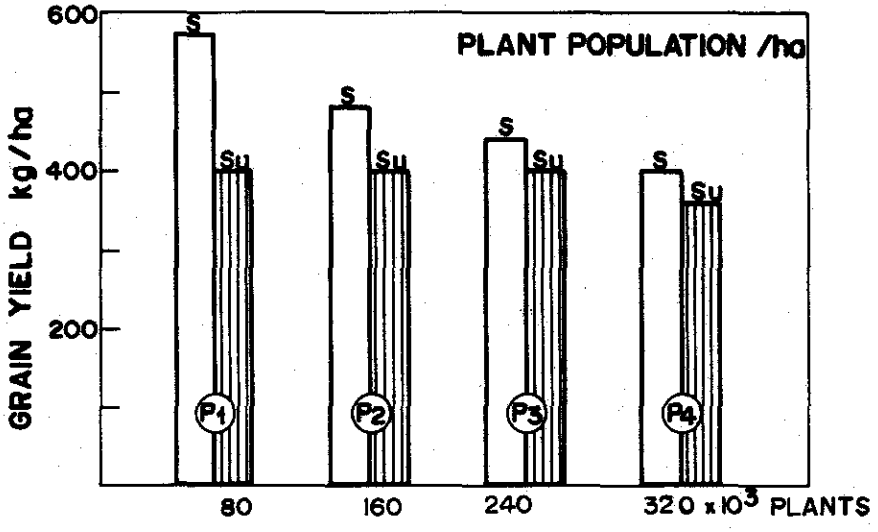

Figure 1. The effect of plant population on grain yield (S = spring and Su = summer seasons).

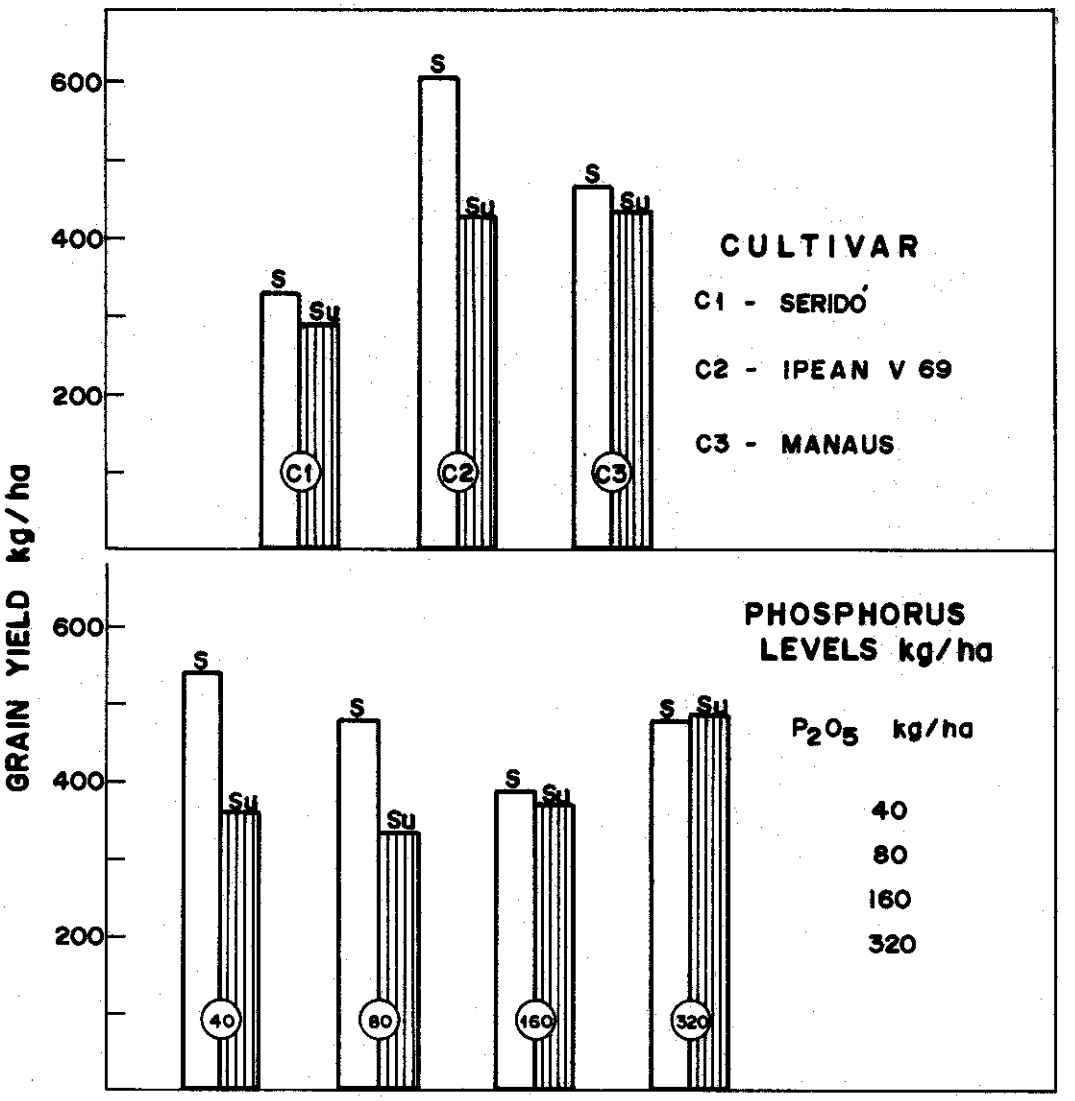

Figure 2. The effect of cultivar and phosphorus level on grain yield (S = spring and Su = summer seasons).

The results obtained are presented in Figures 1 and 2.

The best yields were obtained during the rainy cropping season. During this season, grain yield was lower at the higher plant population. However, during the dry season it was shown that little variation in grain yield occured for the different plant populations.

There was a differential response of the cultivar in relation to the growth habit and grain yield. IPEAN V-69 (semi-erect) showed the best grain yield potential when compared to Seridó (prostated) and 4R-0267-IF (erect).

The highest grain production was obtained using low phosphorus levels. Brazilian cowpea cultivars have been traditionally grown in sandy soils with low fertility. These cultivars have adapted to these soil conditions over many years of cultivation and probably for this reason these cultivars did not respond to high levels of phosphorus.