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Influence of increased plant density and nutrient management on the yield and economics of greengram [*Vigna radiata* (L.) wilczek]

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SUMMARY

Field experiments were conducted during *kharif and rabi* 2002 and summer 2003 at the College of Agricultural Engineering, Kumulur, Tiruchirappalli district of Tamil Nadu to study the effect of increased plant density and nutrient management on the yield and economics of greengram. Three inter row spacings of 20 cm (S_1), 25 cm (S_2) and 30 cm (S_3) with a constant intra row spacing of 10 cm accommodating 5.0, 4.0 and 3.33 lakh plants ha^{-1} were tried in the main plot. The treatments tried in sub plot were recommended N and P (N_1), N_1 with foliar spraying of one per cent sulphate of potash (SOP) (N_2), N_1 with soil application of 25 kg K_2O ha^{-1} as muriate of potash (MOP) (N_3), 125 per cent N and P with foliar spraying of one per cent SOP (N_4), 150 per cent N and P with foliar spraying of one per cent SOP (N_5) and 50 per cent N and P with foliar spraying of two per cent Diammonium phosphate (DAP) and one per cent SOP (N_6). The treatments were fitted in a split plot design replicated thrice. The results of the experiment revealed that higher plant density favoured grain and bhusa yield. In general, higher yield was observed in treatments applied with 125 per cent NP along with foliar sprays during *kharif* 2002 and summer 2003 and with 150 per cent NP with foliar sprays during *rabi* 2002. A population level of 4.0 lakh plants ha^{-1} applied with 125 per cent NP along with foliar spraying of two per cent DAP and one per cent SOP twice recorded higher benefit – cost ratio during *kharif* 2002, gross and net returns and benefit – cost ratio during *rabi* 2002 and gross and net returns during summer 2003.

Key words : Greengram, Increased plant density, Nutrient management, Yield, Economics.

Pulses are the major sources of dietary protein in the vegetarian diet in our country. Besides being a rich source of protein, they maintain soil fertility through biological nitrogen fixation in soil and thus play a vital role in furthering sustainable agriculture (Kannaiyan, 1999). The area under pulses in the country is around 24.38 million hectares with a production of 14.52 million tonnes. Nearly 8 per cent of this area is occupied by greengram (*Vigna radiata),* which is the third important pulse crop of India in terms of area cultivated and production next to gram and pigeon pea. In Tamil Nadu, greengram is cultivated in an area of 1.83 lakh hectares with an annual production of 0.696 lakh tonnes (Kannaiyan, 2000). The productivity of the crop is only 333 kg ha^{-1}. This low yield is attributed to several reasons *viz*, cultivated as rainfed crops, as intercrops in marginal lands, poor management practices and low yield potential of varieties. Nutrient and weed management practices play a major role in realizing the potential of a given variety along with other contributing factors. Availability of short duration greengram varieties with high yield potential and the possibility of raising them all through the year, offers now immense scope to increase the productivity (Natarajan *et al.*,1993).

To exploit the full genetic potentiality of any greengram variety, development of management technology would become atmost important. Under the use of improved crop management practices, greengram responded markedly to plant population level and mineral nutrition especially, when applied in balanced amount and by appropriate methods. Abdur Rahman Sarkar *et al*. (2004) reported that greengram planted at a spacing of 30 x 10 cm significantly produced the highest seed yield. Sekhon *et al*. (1994) reported that the summer greengram raised in loamy sand at 20 cm row spacing recorded 15 per cent higher yield over 30 cm row spacing. Khan *et al*. (1999) reported that Phosphorus application significantly increased the yield of mungbean. Similarly, Chovatia *et al*. (1993) reported that application of Phosphorus increased the seed yield upto 40 kg P_2O_5 ha^{-1}. Muhammad Ather Nadeem *et al*. (2004) reported that higher seed yield of greengram was obtained at a fertilizer level of 30-60 kg N, P_2O_5 ha^{-1}. Pulses are among the crops which have relatively high requirement of S and are particularly sensitive to S deficiency (Tandon, 1995).

Yield is a product of individual plant yield and number of plants per unit area. The number of plants is determined experimentally which gives an indication of maximum utilization of available resources. If these resource limitations are overcome through agronomic manipulations, there will be scope for increasing the plants