

Determination of critical period of crop-weed competition in greengram (*Vigna radiata* L. Wilczek) in the Gangetic alluvial soil of India

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ABSTRACT

A field experiment was conducted in Viswavidyalaya Farm, Kalyani, Nadia, West Bengal, during *Pre-kharif* season 2004 and 2005 to evaluate the critical period of crop-weed competition in summer greengram. The experiment was laid out in randomized block design (RBD) with 6 treatments replicated four times. From this experiment it was recycled that weed free from 7 or 14 DAS resulted significantly higher yield. On the contrary weed free after 28 DAS onwards did not increase the yield significantly over unweeded control.

Key words : Crop weed competition, Green gram.

Pulses are recognized as an integral part of Indian diet and ideal supplement of cereals particularly for predominantly vegetarian population by virtue of their high protein and essential amino acid content. Greengram, one of the most important pulse crops, can be grown throughout the year but primarily it is cultivated as a *pre-kharif* crops. In greengram, weeds compete for different growth resources (light, water, nutrients and space) besides giving shelter to harmful insect-pests and plant pathogens.

The critical period for crop-weed competition is the period from sowing upto which the crop has to be maintained in a weed free environment for remunerative crop production. Thus, critical period is the span of time period after seedling or emergence when weed competition does not reduce crop yield and the time period after which weed competition will no longer reduce the crop yield (Balasubramanian and Ravichandran, 1996). Singh *et al.* (1991) stated that grain yields of greengram increased significantly with increase in weed-free duration upto 30 DAS and concluded that the 15-30 DAS for a summer sown crop of greengram was critical for crop-weed competition.

MATERIALS AND METHODS

A field experiment was conducted at Viswavidyalaya Farm, Kalyani, Nadia, West Bengal during *Pre-kharif* season, 2004 and 2005 in the Gangetic alluvial soil of sandy loam texture having a pH of 6.9 to find out the critical period of crop-weed competition in summer greengram. The experiment

was laid out in randomized block design where 6 treatments were replicated four times. The treatments comprised of weed free from 7 DAS, weed free from 14 DAS, weed free from 21 DAS, weed free from 28 DAS, weed free from 35 DAS and unweeded control. At the end of a particular weedy duration, or at the beginning of maintaining weed-free situation, hand weeding was given at respective treatment plot to make the plot weed free and weed population and biomass of weeds (dry) m² was recorded for that particular treatment plot.

Greengram cv. Pusa Baisakhi were sown at a spacing of 30 cm (R-R) x 10 cm (P-P) with a plot size of 6 x 2.5 m² and fertilizer dose of 20 kg N/ha, 40 kg P₂O₅/ha and 40 kg K₂O/ha. Full dose of N, P₂O₅ and K₂O were applied as basal during final land preparation. The source of N, P₂O₅ and K₂O were urea, single super phosphate and muriate of potash respectively. All the other recommended package of practices were followed to raise the crop.

The density and biomass of weeds were recorded by using quadrates of 0.5 m² randomly placed at four spots in each plot. Yields were taken from 1 m² area for each treatment and were converted for one hectare area.

RESULTS AND DISCUSSION

Effect of crop-weed competition on the yield of greengram

It is clear from the Table 1 that both the number and biomass of weeds increased gradually upto 21 DAS followed by their drastic reduction due to the shading effect of greengram plants on weeds.

Table 1 Effect of crop-weed competition on the density and biomass of weeds and on the yield of green gram (pooled data of 2004 and 2005)

Treatments	Grass		Sedge		Broad leaf		Seed yield of greengram (kg/ha)
	No. of weeds (No./m ²)	Biomass of weeds (g/m ²)	No. of weeds (No./m ²)	Biomass of weeds (g/m ²)	No. of weeds (No./m ²)	Biomass of weeds (g/m ²)	
T ₁ (weed free from 7 DAS)	4.00	2.00	138.50	73.42	7.75	1.25	1434.00
T ₂ (Weed free from 14 DAS)	15.25	8.35	254.75	129.75	18.00	4.30	1387.00
T ₃ (Weed free from 21 DAS)	191.00	39.01	394.50	231.75	23.50	5.64	1218.00
T ₄ (Weed free from 28 DAS)	185.25	39.00	366.02	205.51	37.25	7.22	975.00
T ₅ (Weed free from 35 DAS)	154.75	37.25	383.50	194.50	38.00	7.15	896.00
T ₂ (Unweeded control)	166.50	41.86	408.00	208.75	40.75	8.27	839.50
SEm (±)	12.39	2.63	23.93	14.23	2.59	0.45	28.71
CD at 5%	37.32	7.94	72.08	43.23	7.80	1.37	86.48

Weed free from 7 DAS resulted in the maximum grain yield which was closely followed by and statistically at par with the treatments where weed free situation was maintained from 14 and 21 DAS onwards. Maintenance of weed free situation from 35 DAS did not increase the yield significantly over unweeded control. Competition of weeds with the crops upto 21 DAS did not reduce the yield significantly. But on and from 28 DAS, crop-weed competition reduce the yield which was statistically at par with unweeded control. From the above findings it can be stated that where the plots kept weed free 7 or 14 DAS which gave best result and received highest amount of seed yield of green gram. Therefore, it can be concluded

that the 7-14 DAS upto two weeks for a summer sown crop of greengram was critical for crop-weed competition.

REFERENCES

- Balasubramanian, N. and Ravichandran, V.K. (1996). Crop-weed interactions and competitions. *Advances in Weed Management in an Agro-ecological content*. (Summer Institute, 10-19 June, 1996; TNAU, Coimbatore) : 22-27.
- Singh, G.; Ram, I.C. and Singh, D. (1991). Crop-weed competition studies in green gram and blackgram. *Tropical Pest Management*, 37 (2) : 144-148.