

Effect of weed-control measure on growth and yield of summer greengram (*Phaseolus radiatus*)

A.S. PANWAR¹, V.S. VERMA AND VINOD KUMAR²

R.K. College, Chaudhary Charan Singh University, Shamli, Muzffarnagar,
Uttar Pradesh 247 776

Received : September 1998

ABSTRACT

A field experiment was carried out during 1995-96 and 1996-97 to study the effect of different weed-control measures on summer greengram (*Phaseolus radiatus* L.). Pre-plant application of Fluchloralin 0.75 kg/ha resulted in maximum seed yield of 1,192.48 and 1,305.51 kg/ha compared with 755.15 and 811.23 kg/ha under unweeded control during 1995-96 and 1996-97 respectively. This treatment also resulted in the maximum weed-control efficiency (92.432%). Pre-emergence application of Pendemethalin @ 0.75 kg/ha showed depressing effect on crop growth. However, at lower dose, i.e. 0.50 kg/ha, followed by 1 hoeing showed 90.75% weed-control efficiency with little effect on growth and yield of summer greengram.

Key words : Greengram, Weed control, Weeding, Yield

Production of greengram during summer season offers a good promise in increasing production under assured irrigation condition. Though many short-duration varieties of greengram have been recommended for cultivation, an information on weed control in summer crop is lacking as the weed control in this crop during rainy (*kharif*) season has been proposed through manual weeding or through herbicides, viz. Fluchloralin, Alachlor, nitrogen, and Pendemethalin, with different doses (Patel *et al.*, 1981; Sinha and Singh, 1985; Singh and Singh, 1986). However,

the efficiency of weed-control practices proposed for *kharif* season will vary during summer season. Therefore to found out the suitable weed-control measure during summer season for greengram, the present study was under taken.

MATERIALS AND METHODS

The field experiment was conducted at the research farm of R.K. College, Shamli, during summer season of 1995-96 and 1996-97. The soil was sandy loam, medium in organic carbon (0.64%) and medium in fertility (215 kg N, 20 kg P₂O₅

Present address : ^{1,2}Directorate of Research, Dr Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh

and 256 kg K_2O /ha). 'Pusa Baisakhi' cultivar was sown in row 25 cm apart using 15 kg seed/ha on 15 and 20 March during 1995-96 and 1996-97 respectively. A basal dose of 20 kg N/ha (urea) and 50 kg P_2O_5 /ha (single superphosphate) was applied uniformly at sowing. The experiment consisted 9 treatments (Tables 1, 2) was laid out in randomized block design with 3 replications. Fluchloralin was applied as pre-plant emergence and Pendemethalin as pre-emergence application. Spray was done with Knapack sprayer using flat-fan nozzle and 500 litres water/ha was used. The crop was raised using other recommended practices. The growth and yield data of crop, weeds/m² and dry matter of weed were recorded at harvesting. The weed-control efficiency (WCE) was worked out as per Mani *et al.* (1993).

RESULTS AND DISCUSSION

Weed

The major weed flora observed in the experimental plots comprised *Cyperus rotundus*, *Chenopodium album*, *Digera arvensis*, *Trianthema portulacastrum* and *Cynodon dactylon* and most of the weed species emerged within a fortnight of crop sowing. Among the different weeds, *Cyperus rotundus* and *Cynodon dactylon* were the dominant species. As observed at 50 days after sowing (DAS) both the herbicides gave good control of annual weeds, except *Cyperus rotundus*. Weed population under chemical weed-control treatments were significantly reduced right from the beginning, whereas manual methods could show their effect much later. Two hoeings (125 and 50 DAS) proved

more effective than 1 hoeing (25 DAS) in reducing weed population and dry matter of weed (Table 1), which was evident from weed-control efficiency under 2 hoeing (25 and 50 DAS) than that 1 hoeing (25 DAS).

Minimum dry matter of weeds was recorded under Fluchloralin 0.75 kg/ha with a weed-control efficiency of 92.39% which was closely followed by 2 hoeing (92.32%). Fluchloralin 0.5 kg/ha + 1 hoeing was the best next treatment, where the herbicide kept the weeds under check during initial stages and the effect was sustained by given 1 hoeing which eliminated the weed competition in later stages of crop growth and resulted in 90.71 % weed control efficiency.

Application of Fluchloralin 0.75 kg/ha and 2 hoeing (25 and 50 DAS) proved to be more effective and were at par with each other and showed 92.39 and 92.32% reduction in the dry matter of weed respectively from the unweeded control. These findings are in line with those of Kolar *et al.* (1979) and Kundra *et al.* (1989). Pendemethalin at 0.5 and 0.75 kg/ha and 0.5 kg/ha + 1 hoeing (25 days) also resulted in significant reduction in weed population and their dry matter.

Effect of crop

Weed-control treatment exhibited pronounced effect on seed yield of the crop. Among the hoeing treatments, 2 hoeing (25 and 50 DAS) maintained superiority over 1 hand hoeing (25 DAS). This is because of the fact that the weeds which emerged during later growth stages were controlled by the second hoeing. One hoeing, although, benefited the crop by way of

Table 1. Effect of weed-control treatments on weed population, dry matter and weed-control efficiency in greengram

Treatment	Dose (kg/ha)	Weed population/ m ²		Dry matter of weeds (kg/ha)			Weed-control efficiency (%)		
		1995-96	1996-97	1995-96	1996-97	Pooled	1995-96	1996-97	Mean
Unweeded control		238.54	195.32	2,517.51	2,133.42	2,325.47			
1 hoeing (25 DAS)		112.35	88.54	1,564.42	1,246.15	1,405.29	37.85	41.59	39.72
2 hoeing (25 and 50 DAS)		25.24	12.45	215.37	145.54	180.46	91.45	93.18	92.32
Fluchloralin (pre-plant)	0.5	66.57	44.35	418.48	389.55	404.02	83.38	81.74	89.56
Fluchloralin (pre-plant)	0.75	12.36	8.87	180.85	171.58	176.18	92.82	91.96	92.39
Fluchloralin + 1 hoeing	0.5	35.24	21.65	219.34	210.57	215.95	91.29	90.13	90.71
Pendemethalin (pre-emergence)	0.5	45.38	34.35	350.55	270.72	310.64	86.08	87.31	86.69
Pendemethalin (pre-emergence)	0.75	25.12	27.38	210.25	225.85	218.05	91.65	89.41	90.53
Pendemethalin+ 1 hoeing	0.5	32.25	12.75	247.35	185.94	216.65	90.17	91.28	90.73
CD (P = 0.05)		15.37	14.42	233.45	210.78	219.86			

Table 2. Effect of weed-control treatments on growth and yield of summer greengram

Treatment	Dose (kg/ha)	Plant height (cm)		No. of branches/ plant		No. of pods/ plant		Seed yield (kg/ha)		
		1995-96	1996-97	1995-96	1996-97	1995-96	1996-97	1995-96	1996-97	Pooled
Unweeded control		25.62	24.45	2.21	3.91	62.24	57.42	755.15	811.23	783.19
1 hoeing (25 DAS)		28.71	31.15	3.24	4.52	78.45	68.95	869.24	925.52	897.38
2 hoeing 25 and 50 DAS)		27.84	29.62	3.51	4.62	88.51	79.37	1,012.34	1,172.37	1,092.36
Fluchloralin (pre-plant)	0.5	28.94	28.57	3.73	4.31	91.34	85.45	1,029.45	1,085.88	1,057.67
Fluchloralin (pre-plant)	0.75	32.75	35.15	4.04	5.13	93.38	84.95	1,192.48	1,305.51	1,248.99
Fluchloralin + 1 hoeing	0.5	31.04	33.51	3.85	4.95	90.51	79.48	1,127.35	1,225.45	1,176.48
Pendemethalin (pre-emergence)	0.5	29.42	25.95	3.43	4.74	82.52	74.59	915.75	1,019.95	967.85
Pendemethalin (pre-emergence)	0.75	26.85	23.57	3.32	4.25	78.61	67.42	790.55	845.82	818.19
Pendemethalin + 1 hoeing	0.5	29.65	30.15	3.41	4.57	83.45	95.35	972.28	1,085.54	1,034.51
CD (P = 0.05)		NS	3.62	0.46	0.31	11.32	9.75	128.42	322.45	245.72

increase in yield over unweeded control but the difference was not significant. Two hoeing resulted in 28.30 % increase in grain yield over unweeded control which was also significantly superior to Pendemethalin 0.75 kg/ha. These results are in conformity with the findings of Singh (1985), and Kundra *et al.* (1989).

Pre-plant application of Fluchloralin 0.75 kg/ha proved to be superior to other treatments and gave maximum seed yield, which was 37.29% more than that under unweeded control. The increase in grain yield due to the application of Fluchloralin 0.75 kg/ha could be attributed to its better weed-control efficiency as reflected in significant reduction in weed population and dry matter of weed (Table 1). This treatment did not show any adverse effect on crop growth, rather produced a sizable increase in the number of branches and pods/plant which cumulatively increased the seed yield. Fluchloralin 0.5 kg/ha + 1 hoeing (25 days) was statistically at par with Fluchloralin 0.75 kg/ha and 2 hoeing with respect to seed yield but was superior to Pendemethalin 0.75 kg/ha.

Application of Pendemethalin 0.5 kg/ha + 1 hoeing yielded more yield as compared to unweeded control, but was statistically at par with rest of the treatments. It was also observed that the higher doses of Pendemethalin decreased the yield, however, the response was not significant. The reduction in yield at higher dose of Pendemethalin (0.75 kg/ha) may be due to

the suppressing effect of herbicide on the crop growth which was reflected by reduced plant height, number of branches and pods/plant. However, at lower dose (0.5 kg/ha) the effect was not phytotoxic and when supplemented with 1 hoeing, 92.42% from Fluchloralin 0.75 kg/ha. These results are in conformity with those of Kundra *et al.* (1989).

REFERENCES

- Kolar, J.S., Singh, M., Sandhu, K.S. and Sidhu, A.S. 1979. Studies on weed control in mung bean (*Vigna radiata*). *Journal of Research Punjab Agricultural University, Ludhiana* 16 : 14-18.
- Kundra, H.C., Kuljit, S. and Bara, L.S. 1989. Integrated weed management in summer moong (*Vigna radiata* L.) Wilczk). *Journal of Research, Punjab Agricultural University, Ludhiana* 26 (4) : 556-562.
- Mani, V.S., Mala, Gautam, K.C. and Bhagwan Das. 1973. Weed killing chemicals and potato cultivation. *Indian Farming* 23 (8) : 17-18.
- Patel, H.S., Patel, C.L., Patel, M.C. and Patel, R.C. 1981. Efficiency of different herbicides for control of weeds in summer green gram. Abstr. *Annual Conference, Indian Society of Weed Science*, pp. 26-27.
- Singh, J.N. 1985. A note on comparative efficiency of different methods of weed control in moong (*Phaseolus aureas*). *Indian Journal of Weed Science* 7 : 129-131.
- Singh, B. and Singh, T.R. 1986. Performance of herbicide for weed control in green gram. *Indian Journal of Agronomy* 31 (3) : 302-304.
- Sinha, N.C. and Singh, R.P. 1985. Physiological effects of herbicides on seed yield of mungbean. *Indian Journal of Weed Science* 17 (3) : 61-64.