Seed Research, Vol. 35(2): 164-167, 2007

Response of Integrated Weed Management and Planting Patterns on Seed Productivity of Pea

PARMINDER SINGH, J.S. KANWAR AND KULBIR SINGH

Department of Vegetable Crops, Punjab Agricultural University, Ludhiana 141 004
jskanwar@yahoo.com

ABSTRACT The field experiment was conducted in split plot design with two planting methods i.e. Bed Planting (60 cm and two rows in each beds) and flat planting with 30 cms row to row spacing in main plot and six weed control treatments namely Pendimethalin 0.75 kg. a.i./ha, Pendimethalin 0.75 kg. a.i./ha+ hand weeding 30 days after sowing, Trifluralin 1.25 kg a.i./ha, Trifluralin 0.75 kg a.i./ha + hand weeding 30 days after sowing, hand weeding at 30 days interval and unweeded in sub plot in pea cv. Matar Ageta-6. The application of Pendimethalin 0.50 kg. a.i./ha + hand weeding and Trifluralin 0.75 kg a.i./ha + hand weeding were found suitable for the effective weed control and for increasing seed yield. Bed planting system is the best for getting maximum seed production (17.7 q/ha) due to its congenial environment for root development and ultimately helping better crop stand, hence resulting in more productivity.

Key words: Weed control, herbicides, planting patterns, pea seed production

Pea (*Pisum sativum* L.) is an important vegetable and pulse crop grown on commercial scale in India and abroad. Various factors influence the yield and seed productivity of pea but the competition offered by the weeds is one of the major factors responsible for decreasing the yield in this crop. This crop is infested with both grassy as well as broad leaf weeds resulting in heavy losses in yield. The competition with weeds starts right from germination of seeds and continue until the harvest because of the characters of slow growth in the initial stages coupled with its spreading or semi erect growth habit. The period of first 4 to 8 weeks was observed to be most critical period for weed competitions. About 20 to 50 per cent losses have been reported due to the weeds present in this crop [1, 2 and 3]. Eradication of weeds through traditional methods is tedious, time consuming and uneconomical. Chemical method of controlling weeds in pea has been found effective. The present investigation was, therefore, undertaken to test the efficacy of various herbicides for controlling weeds in pea seed crop under different planting systems in Punjab.

MATERIALS AND METHODS

The present study was undertaken during winter season of 2003-04 and 2004-05 at Punjab Agricultural University, Ludhiana on pea cv Matar Ageta-6. The experiental soil was loamy sand with 80 per cent sand, 10 per cent silt and 9 per cent clay with 0.3 per cent organic carbon and pH of 8.0. The pea crop was sown with hand on 5th November, 2003 and 7th November, 2004 in split plot design with two planting methods i.e. Bed Planting (60 cm and two rows in each beds) and Flat Planting with 30 cms row to row spacing in main plot and six weed control treatments namely Pendimethalin (0.75 kg. a.i./ha) and (0.75 kg. a.i./ha + hand weeding 30 days after sowing); Trifluralin (1.25 kg a.i./ha) and (0.75 kg a.i./ha + hand weeding 30 days after sowing); hand weeding at 30 days interval and unweeded in sub plot. There were three replications. Plot size was kept 2.4 m x 3.0 m. Trifluralin was applied just before sowing the crop and incorporated in the upper soil by a rake and Pendimnthalin was applied as pre emergence sprays in the evening on the same day of seed sowing. Spraying of herbicides was

Received March 2006 Revised May 2007 Accepted May 2007

done with knap sack sprayer having flat fan nozzle using 500 litre of water/ha. Recommended dose of fertilizer and irrigation were applied uniformly in all the treatments. In all, four irrigations were given in the experiment. The data was recorded on the crop emergence (in one metre row length) and on growth and seed yield parameters of the crop. Simultaneously the data was also recorded on weed density and dry matter in each treatment.

RESULTS AND DISCUSSION

The analysis of pooled data for two years in Table 1 showed that neither the weed control treatments nor planting patterns had any significant effect on the seed emergence and on number of branches per plant. However, plant height at 60 and 120 days after sowing (DAS) was significantly affected by both the weed control treatments and the planting patterns. The application of Trifluralin 0.75 kg a.i./ha followed by hand weeding gave maximum plant height 60 DAS which was at par with hand weeded check and was significantly higher than rest of the treatments. At 120 DAS, maximum plant height was in hand weeded treatment which was significantly higher than other treatments. With respect to planting pattern, bed planting was favourable to increase the plant height at 60 and 120 DAS (30.5cm and 53.0cm) as compared to flat sowing which had plant height of 29.3 and 51.6 cm respectivly. Zhao [4] and Borrel *et al.* [5] also reported higher plant height under bed planting system due to better aeration and other favourable conditions which resulted in higher uptake of nutrients and other inputs.

The highest number of pods per plant and number of seeds per plant recorded in hand weeded which was at par with Trifluralin @ 0.75 kg a.i./ha + HW and Pendimethalin @ 0.50 kg a.i./ha + HW treatments. The more number of pods per plant and number of seeds per pod in these treatments is due to less competition offered by weeds for nutrients and other inputs which resulted in more uptake of nutrients and other photosynthates. The number of pod per plant (17.1) and number of seeds per pod (5.7) were maximum under bed-planting which was significantly superior to flat sowing which had 15.9 and 5.4 respectively. The more number of pods per plant and more seeds per pod were due to the better plant growth because of the congenial conditions. Randhawa [6] also observed similar results in soybean.

The maximum seed yield was obtained with hand weeded treatment (20.8 q/ha) which was statistically superior from rest of the treatments, followed by the application of Trifluaralin + HW. All the weed control treatments gave higher seed yield than the unweeded check. The bed planting system has given more seed yield (17.70 q/h) than flat system (16.82) (Table 1). The higher seed yield obtained under bed planting system is due to better crop stand, better vegetative growth, more number of pods/plants and more number of seeds per pod. Similar results have also been reported by Rana [7] in pea and Kumar *et al.* [8] in soybean.

The crop was infested with some of the prominent weed species such as *Chenopodium album, Medicago denticulate, Rumex dentatus, Sisymbrium irio, Fumaria parviflora, Asphodelus tenuifolius, Anagallis arvensis, Melitotus indica, Avenua Indovicinana, Phalaris minor* etc.

All weed control treatments were significantly superior to unweeded check in reducing the population of both grassy and broad leaf weeds as well as dry weight of weeds (Table 2). Combination of hand weeding with Pendimethalin and Trifluaralin application significantly reduced the population and dry weight of weeds as compared to the lone application of herbicide. It was also observed that bed planting resulted in lower number of weed populations, less dry weight of weeds as compared to flat sowing. This may be due to better initial vegetative growth of plants at early stage of growth and better efficacy of the herbicides. Kumar and Singh [9] and Butter and Aulakh [10] also reported that integration of hand weeding and chemical reduced the weed dry matter and weed population.

Thus it can be concluded from the study that the application of Pendimethalin 0.50 kg. a.i. /ha + hand weeding and Trifluralin 0.75 kg a.i. /ha + hand weeding were found suitable for the control of weeds and for increasing the seed yield. Bed planting system is the best for getting maximum seed production due to its congenial environment for root development and ultimately helping better crop stand, hence resulting in more productivity.

Table 1. Effect of planting patterns and weed control treatments on crop emergence, growth and seed yield parameters in pea seed crop (Pooled data of two years)

Weed control treatments Dose (ai kg/ha)	Crop emergence (No. of seeds emerged in one metre row)		Plant height (cm) (60 DAS)		Plant height (cm) (120 DAS)		Pods/plant		Seeds/pod		Seed yield (q/ha)	
	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat
Pendimethalin 0.75	11.3	12.0	29.5	27.2	53.8	51.8	17.5	15.3	6.0	5.4	18.4	16.7
Pendimethalin 0.50 +HW	12.6	12.6	31.2	29.6	53.8	53.7	19.0	17.7	6.0	5.7	20.2	18.2
Trifluralin 1.25	11.8	11.7	29.0	27.7	51.1	49.5	17.5	15.3	5.8	5.2	18.1	16.6
Trifluralin 0.75 + HW	12.0	12.5	32.2	32.1	56.5	54.1	18.9	17.9	6.1	5.8	19.8	18.7
Hand weeded	11.5	11.7	31.8	31.9	57.4	57.9	19.3	19.2	6.2	6.2	20.9	20.4
Unweeded	11.3	11.6	29.6	27.6	45.3	42.7	10.2	10.3	4.2	4.1	8.8	8.6
Mean	11.8	12.0	30.5	29.3	53.0	51.6	17.1	15.9	5.7	5.4	17.7	16.5
CD (P = 0.05)												
Planting patterns	NS		1.5		1.3		1.3		0.3		0.5	
Herbicides	NS		2.0		1.3		1.5		0.7		0.5	
Planting patterns x Herbicides	NS		NS		2.6		NS		NS		0.9	

REFERENCES

1. SANDHU, K.S., S. SINGH, J.S. KOLAR & A.P. SINGH (1978). Weed control studies in pea (*Pisum saitvum* L). *J. Res Punjab agric. Univ.*, **15**: 236-40.
2. SINGH, J.S., V.M. BHAN & R.S. BALYAN (1991). Crop weed competition studies in pea (*Pisum sativum*). *Ind J. Weed Sci.*, **23**(1&2): 67-68.
3. SHARMA, J. (1993). Evaluation of herbicides in pea (*Pisum satvum*) in Mid Hills of Himachal Pradesh. *Indian J. Weed Sci.*, **25**(3&4): 36-39.
4. ZHAO, Z.M. (1991). A study of mechanized cultural techniques for low wetland using platform field methods. *Soybean Sci.*, **10**:139-44.
5. BORREL, A., A. GARSIDE & S. FUKAI (1997). Improving efficiency of water use for rice in semi and tropical environment. *Filed Crop Res.*, **52**: 241-48.
6. RANDHAWA, B.S. (1994), The influence of production variables on the growth and yield of soybean (*Glycine max* L. Merrill). M.Sc. thesis, Punjab Agricultural University, Ludhiana, India
7. RANA, S.S. (2002). Integrated weed management in Pea (*Pisum sativum* L) under Sangla Valley conditions of Himachal Pradesh. *Ind. J. Weed Sci.*, **34**: 204-07.
8. KUMAR, R., S. SINGH & R.S. BALYAN (2005). Effect of various treatments on weeds in soybean (*Glycine max* L.). *Annals of Biology*, **21**: 29-32.
9. KUMAR, S. & C.M. SINGH (1994). Integrated weed management in vegetable pea (*Pisum sativum*) under dry temperate conditions. *Indian J. Weed Sci.*, **26**(3&4): 40-44.
10. BUTTER, G.S. & C.S. AULAKH (2004). Trifluralin for weed control in mungbean (*Vigna radiata* L.). *J. Res. Punjab agric. Univ.*, **41**:317-19.

Table 2. Effect of planting patterns and weed control treatments on weed population and its dry weight in pea seed crop (Pooled data of two years)

Herbicide Dose (a.i/ha)	Weed population per sq metre								Dry weight of weeds (q/ha)							
	30 days		60 days		90 days		120 days		30 days		60 days		90 days		120 days	
	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat	Bed	Flat
Pendimethalin 0.75	11.0	12.6	20.0	25.0	32.3	28.3	37.5	49.7	0.2	0.1	2.1	2.5	4.6	5.1	7.8	6.8
Pendimethalin 0.50 +HW	15.5	16.8	16.0	21.2	19.8	19.5	27.0	39.7	0.2	0.2	1.4	1.7	1.6	2.0	2.8	5.4
Trifluralin 1.25	14.0	12.5	22.5	21.5	28.1	24.0	38.5	34.5	0.2	0.2	2.1	2.5	4.3	4.7	7.1	7.6
Trifluralin 0.75 + HW	16.2	17.2	13.0	14.5	14.8	19.5	25.5	31.0	0.2	0.1	1.4	2.4	1.6	1.9	2.9	4.5
Hand weeded	247.0	254.3	140.0	141.0	75.0	90.2	15.3	19.3	0.8	0.8	3.0	3.4	2.2	2.6	2.5	3.3
Unweeded	268.0	314.0	277.3	308.5	300.5	317.7	264.0	273.3	0.9	0.9	4.8	5.4	10.6	11.0	21.4	29.0
Mean	98.3	104.8	81.3	88.6	178.6	83.3	74.7	74.6	0.4	0.4	2.5	3.0	4.2	4.6	7.4	9.4
CD (p = 0.05)																
Planting patterns	NS		5.4		1.4		3.6		NS		0.1		0.2		0.8	
Herbicides	8.9		5.1		7.0		4.5		0.1		0.1		0.3		0.7	
Planting patterns x Herbicides	NS		10.1		14.1		9.0		NS		0.2		NS		1.4	