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Efficacy of Post-emergence Herbicides Against Wild Oats in Field Pea

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Diversification of rice-wheat cropping system with greater inclusion of legumes is essential to alleviate declining factor productivity, input use efficiency and sustainability. Inclusion of field pea (*Pisum sativum* L.) during winter season may be an alternative to wheat because of its higher productivity as compared to other winter legumes. Weed competition is, however, a serious limitation in field pea reducing 18-76% seed yields (Singh *et al.*, 1991; Mishra and Bhan, 1997). Grassy weeds especially wild oats (*Avena ludoviciana* Dur.) and canary grass (*Phalaris minor* Retz.) are the major problems in irrigated ecosystem. Weed control is accomplished primarily through manual/mechanical weeding and pre-plant or pre-emergence herbicides such as fluchloralin, pendimethalin, alachlor and oxadiazon. However, there is a lack of post-emergence herbicides in legume crops. Hence, the present investigation was undertaken to evaluate the efficacy of some post-emergence herbicides against wild oats in field pea.

The present experiment was conducted during winter season of 2005-06 at National Research Centre for Weed Science, Jabalpur (23° 90′ N, 79° 58′ E, 412 m above mean sea level). The soil was clay loam (Typic Chromusterts) in nature, medium in organic carbon (0.62%), low in available nitrogen (235 kg ha^{-1}), medium in available phosphorus (17.5 kg ha^{-1}) and potassium (298 kg ha^{-1}) with neutral reaction (pH 7.1). Seven treatments (Table 1) consisting of clodinafop-propargyl at 60 g ha^{-1}, fluazifop-p-butyl at 500 g ha^{-1}, fenoxaprop-p-ethyl at 80 g ha^{-1}, metribuzin at 250 g ha^{-1}, imazethapyr at 100 g ha^{-1} alongwith one hand weeding (HW) and weedy check were replicated four times in a randomized block design. All the herbicides were applied at 30 days after sowing. Field pea 'JP 885' was sown on November 15 in 2005 using zero-till drill with 100 kg seed ha^{-1}. A basal dose of 20 kg N and 60 kg P_2O_5 ha^{-1} through di-ammonium phosphate was applied at the time of sowing. The crop was raised under irrigated condition with recommended package of practices. Weed population and weed dry matter were recorded at 60 DAS by placing a quadrate of 0.50 m x 0.50 m (0.25 m^2) size randomly at four places in a plot. The economics of treatments was computed with minimum support price or prevailing market rate of products.

The experimental field was dominated with wild oats (92.8%) with minor presence of *Medicago hispida* (7.2%). All herbicides except metribuzin significantly reduced the population of wild oats as compared to weedy check (Table 1). Fenoxaprop-p ethyl was most effective and was at par to one hand weeding. However, all these herbicides except imazethapyr were not effective against *M. hispida*. All the herbicides except metribuzin resulted in significant reduction in dry weight of wild oats. The lowest dry weight of wild oats (23 g m^{-2}) was recorded with fluazifop-p-butyl followed by hand weeding (69 g m^{-2}) and fenoxaprop-p-ethyl (73 g m^{-2}). Metribuzin being at par with imazethapyr produced significantly the lowest dry weight (9 g m^{-2}) of *M. hispida*. Maximum weed control efficiency (74.2%) was obtained with fluazifop-p-butyl followed by hand weeding (71.2%) due to effective weed control. Lowest weed control efficiency (26.4%) was recorded in metribuzin due to poor control of wild oats.

The seed yield due to various weed control treatments varied significantly (Table 1). The highest seed yield (3167 kg ha^{-1}) was obtained with one hand weeding, closely followed by clodinafop-propargyl (3083 kg ha^{-1}). Significantly lower seed yield in metribuzin (2500 kg ha^{-1}) was due to ineffective control of wild oats. Infestation of weeds throughout the crop growth period caused 65.8% reduction in seed yield of field pea as compared to one hand weeding. The lowest yield loss (2.6%) was obtained with clodinafop-propargyl. The maximum net returns

Table 1. Effect of herbicides on population and dry matter of weeds, yield and economics in pea

Treatment	Dose ($g\ ha^{-1}$)	Weed population 60 DAS ($No.\ m^{-2}$)			Weed dry weight 60 DAS ($g\ m^{-2}$)			Seed yield ($kg\ ha^{-1}$)	Gross returns ($Rs.\ ha^{-1}$)	Net returns ($Rs.\ ha^{-1}$)	B : C ratio
		A. ludoviciana	*M. hispida*	Total	*A. ludloviciana*	*M. hispida*	Total				
Clodinafop- propargyl	060	291	69	360	140	32	172	3083	30830	20775	3.07
Fluazifop-p-butyl	500	175	42	217	023	64	087	2750	27500	18150	2.94
Fenoxaprop-p-ethyl	080	056	43	099	073	53	126	2833	28330	19055	3.05
Metribuzin	250	863	50	913	239	9	248	2500	25000	16035	2.79
Imazethapyr	100	531	08	539	156	21	177	2833	28330	18550	2.89
Hand weeding	One	068	56	124	069	28	097	3167	31670	17670	2.26
Weedy		887	68	945	291	46	337	1083	10830	02830	1.35
LSD (P=0.05)		095	29	110	058	13	055	0514			

Selling price of pea : Rs. 10.00 kg^{-1}, Price of herbicides : Topik 15% WP (Clodinafop-propargyl)–Rs. 4687 kg^{-1}, Whip supar 9.3% EC (Fenoxaprop-p-ethyl)–Rs. 1300 l^{-1}, Fusilade (Fluazifop-p-butyl)–Rs. 1350 l^{-1}, Pursuit 10% SL (Imazethapyr)–Rs. 1600 l^{-1}, Sencor 70%WP (Metribuzin)–Rs. 2200 kg^{-1}, Hand weeding : 100 labours ha^{-1}, Labour cost–Rs. 60 day^{-1} $head^{-1}$. DAS–Days after sowing.

(Rs. 20775 ha^{-1}) and B : C ratio (3.07) were obtained in clodinafop-propargyl. The lowest net returns (Rs. 2830 ha^{-1}) and B : C ratio (1.35) were recorded with weedy check due to poor crop yield.

It may be concluded that clodinafop-propargyl, fenoxaprop-p-ethyl, fluazifop-p-butyl or imazethapyr could be used safely as post-emergence for effective control of wild oats in field pea.

REFERENCES

Mishra, J. S. and V. M. Bhan, 1997. Effect of cultivar and weed control on weed growth and yield of pea (*Pisum sativum*). *Indian J. Agron.* **42** : 316-319.

Singh, J., S. Kumar, V. M. Bhan and R. S. Balyan, 1991. Crop-weed competition studies in pea (*Pisum sativum* L.). *Indian J. Weed Sci.* **23** : 67-68.