Indian Journal of Weed Science 42(1&2) : 101-103, 2010 **Short Communication**

Studies of weed control efficiency by application of post-emergence herbicides in soybean in Chhattisgarh plain

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ABSTRACT

Weeds infestation is very common in soybean which can reduce the yield potential drastically under *kharif* crop. It is two dimensional crop containing protein and oil. The weeds were rampant if they would not be controlled at proper time. To overcome the weeds problem of soybean, the study was carried out comprising different herbicides alone and in combination. The post-emergence application of lactofen 120g/ha + propaquizafop 60 g/ha was found having higher weed control efficiency with higher grain yield. All the recorded weed flora were found with reduce dry matter accumulation by combined application of herbicides rather than alone application.

Key words : Chemical control, Soybean, Lactofen, Propaqizafop

Soybean (*Glycine max* (L) Merrill) is a wonder crop of twentieth century. It is an excellent source of protein and fat. Besides, it contains high levels of amino acids (lysine, leucine) lecithin and large amount of phosphorus. It is two-dimensional crop as it contains about 40-42% high quality protein and 20-22% oil. It is now well established as the cheap source of protein and edible oil. Though, the potential productivity of this crop is higher but turning production is lower due to weed infestation. The reasons for lower productivity are mainly non-adoption of the proper package and practices, the major being insufficient weed control operation. Weeds compete with crop in initial stages for limited essential resources and seriously depress the crop growth and development (Singh *et al.* 1984). Applications of suitable weed control measures are the most important factors for improving the productivity of this crop. However, pre-emergence herbicides have some limitation like limited period of application. Hence, use of the post-emergence herbicides has better prospects.

The field experiment was carried out at Instructional Farm of IGKV, Raipur situated in Chhattisgarh during *kharif* 2005 at latitude longitude and altitude of 21^{0}06' N, 81^{0}36' E and 289.56 m above mean sea level, respectively. The climate was sub-humid to semi-arid with mean annual rainfall of about 1250 mm of which 85% occurring during June to September, maximum temperature goes as high as 46^{0}C during summer and minimum as low as 6^{0}C during winter months. Experiment was conducted in clay soil with low nitrogen, medium phosphorous and high potash (216.81, 13.85 and 364.75, respectively) and 7.15 pH. The experiment consisted of fifteen treatments in three replications was laid out in randomized block design. Treatments were T_1 - Fenoxaprop-p-ethyl 80 g/ha, T_2- Propaquizafop 60 g/ha, T_3 - Bentazon 1000 g/ha, T_4- Chlorimuron-ethyl 6 g/ha, T_5- Imazethapyr 80 g/ha, T_6- Lactofen 120 g/ha, T_7 - Bentazon + Fenoxaprop-p-ethyl 1000 g + 80 g/ha, T_8 - Chlorimuron + fenoxaprop-p-ethyl, T_9 - Chlorimuron + Propaquizafop, T_{10} - Imazethapyr + Fenoxaprop- p-ethyl, T_{11}- Imazethgapyr + propaquizafop, T_{12} - Lactofen + Fenoxaprop-p-ethyl , T_{13} - Lactofen + propaquizafop, T_{14} - Hand weeding, T_{15}- Unweeded check. All treatments were applied at 20 days after sowing (DAS). Weed density, dry weight and weed control efficiency were calculated on the basis of reduction in seed weight under particular treatment in comparison with the weed weight under no weeding treatment before application, two week after application and at harvest and expressed in per cent as suggested by Maini *et al.* (1973).

All the recorded weed flora were found with reduced dry matter accumulation treated with combined application of herbicides rather than alone application. Weeds *viz.*, *Commelina* species*, Euphorbia geniculata, Phyllanthus niruri, Cyperus rotundus* and *Cynodon dactylon* were managed properly because of simultaneous emergence of weeds (Table 1). Weed control efficiency was recorded at 2 week after spray (WAS). The maximum weed control efficiency was observed under hand weeding twice. Amongst the herbicidal treatments at 2 week after application, the maximum WCE (93.35%) was recorded under T_{10}. Imazethapyr + fenoxaprop-p-ethyl showed high capacity of weed control efficiency with varied control levels followed by T_9 (chlorimuron + propaquizafop) and T_{11} (imazethapyr + propaquizafop) (Table 2). The weed control efficiency (WCE) was inversely related to dry matter production of weeds. The dry matter production of weeds was low under hand weeding twice (Upadhyay *et al.* 1992). In case of single application of herbicides, T_4

Table 1. Dry matter of weeds influenced by different weed control treatments 2 week before spray (g^2)

Treatments	*Commelina beghalensis*	*Commelina nudiflora*	*Euphorbia geniculata*	*Cyperus rotundus*	*Cynodon dactylon*	*Phyllanthus niruri*	Others
T_1	9.5 (3.2)	21.5 (4.4)	79.6 (9.0)	42.9 (6.6)	4.4 (2.2)	108.8 (10.5)	35.4 (6.0)
T_2	3.3 (2.0)	4.7 (2.3)	92.0 (9.6)	65.9 (8.2)	14.2 (3.8)	72.3 (8.5)	17.4 (4.2)
T_3	5.0 (2.3)	24.6 (5.0)	212.1 (14.6)	55.8 (7.5)	8.2 (3.0)	54.6 (7.4)	43.9 (6.7)
T_4	7.8 (2.9)	2.6 (1.8)	73.5 (8.6)	62.7 (8.0)	4.7 (2.3)	31.5 (5.7)	29.1 (5.5)
T_5	4.9 (2.3)	3.9 (2.1)	124.8 (11.2)	36.7 (6.1)	13.0 (3.7)	33.3 (5.8)	28.9 (5.4)
T_6	20.9 (4.6)	6.6 (2.7)	120.8 (11.0)	43.7 (6.7)	2.3 (1.7)	34.6 (5.9)	44.1 (6.7)
T_7	1.8 (1.5)	5.1 (2.4)	81.1 (9.1)	42.5 (6.6)	3.6 (2.1)	71.1 (8.5)	45.2 (6.8)
T_8	2.8 (1.8)	20.2 (4.6)	75.6 (8.7)	38.5 (6.3)	4.7 (2.3)	57.2 (7.6)	35.7 (6.0)
T_9	1.7 (1.5)	1.8 (1.5)	51.3 (7.2)	30.5 (5.6)	1.1 (1.3)	64.5 (8.1)	12.8 (3.7)
T_{10}	3.1 (1.9)	2.3 (1.7)	52.4 (7.3)	14.0 (3.8)	2.1 (1.6)	17.8 (4.3)	16.5 (4.1)
T_{11}	1.2 (1.3)	1.3 (1.4)	102.9 (10.2)	18.4 (4.4)	1.2 (1.3)	2.1 (1.6)	15.8 (4.0)
T_{12}	2.9 (1.8)	4.9 (2.3)	124.1 (11.2)	60.8 (7.8)	1.4 (1.4)	36.8 (6.1)	47.1 (6.9)
T_{13}	2.7 (1.8)	10.5 (3.3)	186.8 (13.7)	67.2 (8.2)	10.4 (3.3)	28.9 (5.4)	27.3 (5.3)
T_{14}	0.8 (1.2)	1.0 (1.2)	12.8 (3.7)	17.6 (4.3)	0.9 (1.2)	1.9 (1.5)	11.5 (3.5)
T_{15}	22.7 (4.8)	138.2 (11.8)	285.5 (16.9)	145.4 (12.1)	22.7 (4.8)	127.4 (11.3)	62.5 (7.9)
LSD (P=0.05)	0.4	NS	1.6	NS	NS	1.06	1.7

*Figures in parenthesis denote transformed values, Treatment details are given in materials and methods.

Table 2. Dry matter of weeds influenced by different weed control treatments 2 week after spray (g/m^2)

Treatments	*Comm elina beghalensis*	*Commelina nudiflora*	*Euphorbia geniculata*	*Cyperus rotundus*	*Cynodon dactylon*	*Phyllanthus niruri*	Others
T_1	2.53 (1.74)	5.72 (2.49)	21.23 (4.66)	11.44 (3.46)	1.17 (1.29)	29.02 (5.43)	9.44 (3.15)
T_2	0.88 (1.17)	1.26 (1.33)	24.54 (5.00)	17.56 (4.25)	3.77 (2.07)	19.27 (4.45)	4.65 (2.27)
T_3	1.32 (1.35)	6.57 (2.66)	56.55 (7.55)	14.89 (3.92)	2.19 (1.64)	14.57 (3.88)	11.70 (3.49)
T_4	2.07 (1.60)	0.69 (1.09)	19.61 (4.48)	16.73 (4.15)	1.25 (1.32)	8.40 (2.98)	7.77 (2.88)
T_5	1.31 (1.35)	1.03 (1.24)	33.29 (5.81)	9.78 (3.21)	3.47 (1.99)	8.88 (3.06)	7.71 (2.87)
T_6	5.58 (2.47)	1.76 (1.50)	32.21 (5.72)	11.65 (3.49)	0.60 (1.05)	9.22 (3.12)	11.76 (3.50)
T_7	0.49 (0.99)	1.35 (1.36)	21.62 (4.70)	11.32 (3.44)	0.96 (1.21)	18.97 (4.41)	12.04 (3.54)
T_8	0.75 (1.12)	5.39 (2.43)	20.15 (4.54)	10.26 (3.28)	1.25 (1.32)	15.25 (3.97)	9.53 (3.17)
T_9	0.44 (0.97)	0.49 (0.99)	17. 05 (4.19)	8.13 (2.94)	0.29 (0.89)	17.19 (4.21)	3.42 (1.98)
T_{10}	0.83 (1.15)	0.62 (1.06)	13.96 (3.80)	3.74 (2.06)	0.56 (1.03)	4.75 (2.29)	4.41 (2.22)
T_{11}	0.32 (0.91)	0.35 (0.92)	27.45 (5.29)	4.91 (2.33)	0.31 (0.90)	0.57 (1.03)	4.22 (2.17)
T_{12}	0.76 (1.12)	1.31 (1.35)	33.10 (5.80)	16.21 (4.09)	0.37 (0.93)	9.81 (3.21)	12.55 (3.61)
T_{13}	0.71 (1.10)	2.81 (1.82)	49.82 (7.09)	17.92 (4.29)	2.76 (1.81)	7.71 (2.87)	7.28 (2.79)
T_{14}	0.22 (0.85)	0.26 (0.87)	3.42 (1.98)	4.68 (2.28)	0.24 (0.86)	0.50 (1.00)	3.07 (1.89)
T_{15}	6.06 (2.56)	36.86 (6.11)	76.12 (9.22)	38.77 (6.27)	6.07 (2.56)	33.98 (5.87)	16.67 (4.14)
LSD (P=0.05)	0.12	0.32	1.69	1.96	0.51	0.44	0.69

* Figures in bolds denote transformed values, Treatment details are given in materials and methods.

Table 3 Influence of different weed management practices on weed control efficiency

Treatments	WCE (%) at 2 WAS	Yield (kg/ha)	
		Seed	Straw
T_1 - Fenoxaprop-p-ethyl 80 g/ha	56.77	1263	3130
T_2 - Propaquizafop 60 g/ha	61.63	1098	2522
T_3 - Bentazon 1000 g/ha	42.15	948	2882
T_4 - Chlorimuron-ethyl 6 g/ha	69.67	1357	3259
T_5 - Imazethapyr 80 g/ha	65.09	1446	3841
T_6 - Lactofen 120 g/ha	60.94	969	3200
T_7 - Bentazon + fenoxaprop-p-ethyl 1000 g + 80 g/ha	64.18	1122	2989
T_8 - Chlorimuron + fenoxaprop-p-ethyl	66.42	1361	3352
T_9 - Chlorimuron + propaquizafop	83.69	1750	3856
T_{10} - Imazethapyr + fenoxaprop-p-ethyl	84.29	1767	3952
T_{11} - Imazethgapyr+ propaquizafop	79.54	1870	4186
T_{12} - Lactofen + fenoxaprop-p-ethyl	60.23	1407	3200
T_{13} - Lactofen + propaquizafop	52.23	1435	3362
T_{14} - Hand weeding (20 and 40 DAS)	93.35	1963	4372
T_{15} - Unweeded check	0.00	548	2193
LSD(P=0.05)		341	673

WAS- Weeks after spraying, DAS - Days after sowing, WCE - Weed control efficiency

(chlorimuron-ethyl) gave better yield, which was remarkable over rest of single treatment. The WCE was highest under these treatments as compared to other treatments (Table 3). These results have been supported by Raghuvanshi *et al*. (1990) and Nelson and Renner (1998). The maximum grain yield of soybean crop recorded in T_{11} (imazethapyr + propaquizefop combination) with production of 1870 kg/ha, which was significantly superior over rest of treatments except T_9 (chlorimuron + propaquizefop and imazethapyr + fenoxaprop-p-ethyl) with 1750 and 1767 kg/ha, respectively. These were comparable to highest yield. Uncombined treatments, T_3 and T_4 had good weed controlling efficiency along with production of 1357 kg/ha and 1446 kg/ha, respectively. The yield was maximum in hand weeding twice. The treatments, chlorimuron- ethyl 6 g/ha +propaquizefop 60 g/ha, imazethapyr 80 g/ha + fenoxaprop-p ethyl 80 g/ha and imazethapyr 80 g/ha + propaquizefop 60 g/ha were found at par with other treatments. The results are in conforming with Bhillore *et.al* (1999).

Application of herbicides may also be the possible reason for higher seed yield of a crop, which was mainly determined by its growth and developments. The capacity of plants to produce seed yield depends not only on the size of photosynthetic system but also for its efficiency and length of the time for which it is active besides on translocation of dry matter into the economic sink.

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