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RESEARCH PAPER

To find out suitable post-emergence herbicide for weed control in soybean under Marathwada region

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Abstract : An investigation was undertaken to find out suitable post emergence herbicides for weed control in soybean under Marathwada region at Department of Agronomy, Marathwada Agricultural University, Parbhani during the *Kharif* season of the year 2010. Highest number of pods plant^{-1} (40.62), seed yield (2888 kg ha^{-1}), straw yield (3570 kg ha^{-1}) and weed control efficiency at 40 DAS and at harvest (monocot and dicot) *i.e.*, 98.43, 98.78 and 96.19, 95.93 per cent, respectively were recorded in treatment (T_{10}) weed free check (2 HW + 2 hoeing at 3rd and 5th WAS). Followed by treatment T_9 pendimethalin PE @ 750 g a.i.ha^{-1} + 1 HW at 30 DAS, number of pods plant^{-1} (38.66), seed yield (2820 kg ha^{-1}), straw yield (3503 kg ha^{-1}) and WCE 97.10,97.23 and 89.40,85.55 per cent monocot and dicot at 40 DAS and at harvest, respectively. Weed index *i.e.*, lowest yield loss over weed free check was observed in treatment T_9 pendimethalin PE @ 750 g a.i.ha^{-1}+1 HW at 30 DAS (2.35%) and amongst the post emergence herbicides treatment (T_8) imazethapyr POE @ 75 g a.i.ha^{-1} at 21 DAS (6.33%). Amongst the post emergence herbicides treatment (T_8) imazethapyr POE @ 75 g a.i.ha^{-1} at 21 DAS were recorded highest number of pods plant^{-1} (38.25), seed yield (2705 kg ha^{-1}), straw yield (3416 kg ha^{-1}), WCE 96.02,96.42 and 86.05,81.68 per cent monocot and dicot at 40 DAS and at harvest, respectively and weed index 6.33 per cent as compared to other post herbicidal treatments.

Key Words : Soybean, Post emergence, Weeds control

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INTRODUCTION

Soybean (*Glycine max* L.), otherwise known as a 'miracle crop' with over 40 per cent protein and 20 per cent oil, originated in China. Soybean has now become the largest source of vegetable oil and protein in the world and its large scale cultivation in few countries such as Argentina, Brazil, Canada, China, India, Paraguay and USA. Soybean has not only gained the vital importance in Indian agriculture but also plays a decisive role in oil economy of India soybean has been accredited as principle food crop since long time, that produces 2-3 times more high quality protein yield per hectare than other pulses and it is preferred especially by vegetarians on account of its richness in protein, fat, carbohydrates, mineral salts and vitamins. It is a multipurpose crop used for making soymilk, soya paneer, soya yogurt, soya ice-cream etc. In Maharashtra the area under this crop is

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mainly occupied by Marathwada region about 26.320 lakh hectares with production of 27.543 MT and average productivity of 1058 kg ha^{-1} (Anonymous, 2010). One of the limiting factor for low yield was found to be weed competition. (Muzik, 1979) and Rao (1987) reported 76 per cent losses in soybean yield due to weed infestation in India (Chhokar *et al.*,1997 and Singh, 2005). In *Kharif* season, the weed competition is one of the most important causes of yield and estimated to be 30-80 per cent (Yaduraju, 2002; Dubey *et al.*, 1996; Hussain and Gogoi, 1996 and Reddy *et al.*, 2003).The herbicides presently available are either pre-emergence (PE) and have narrow spectrum of weed control. If farmer skip application of these pre –emergence herbicides or pre-plant incorporated herbicides due to some reasons, require alternative post –emergence herbicides for managing weeds. Post emergence herbicides may be applied as per need of time and place saving time, money and labour (Bhalla *et al.*,1998). Therefore, there is a need of testing new post-emergence herbicides which have broader spectrum of activity (Kumar *et al.*, 2008). Recently new post –emergence herbicides have been released in India and weed evaluation for field use. So keeping these facts in view an attempt was made in study to evaluate efficacy of post emergence herbicides for weed control in soybean under Marathwada region.

MATERIAL AND METHODS

The field experiment was conducted during *Kharif* season of the year 2010 at the Agronomy Farm, Marathwada Agricultural University, Parbhani. Soil of the experimental field was black and clayey in texture. The experiment was laid out in Randomized Block Design (RBD) with twelve treatments replicated three times. Allocation of treatment at each plot in each replication was done by randomization. The plot size was 4.8 m × 4.5 m and seeds were sown at 45 × 05 cm distance. The

Table 1 : Yield attributing characters influenced by different weed control treatments

Treatments	Number of pods plant^{-1} at harvest	Seed yield (kg ha^{-1})	Straw yield (kg ha^{-1})	WCE(%) at 20 DAS		WCE(%) at 40 DAS		WCE % at Harvest		Weed index
				Monocot	Dicot	Monocot	Dicot	Monocot	Dicot	Weed index %
T_1 - Trifluraline POE @ 125 g a.i. ha^{-1} at 15 DAS	33.87	2318	3076	77.18	80.46	81.30	79.49	77.10	69.66	19.73
T_2 - Trifluraline POE @ 150 g a.i. ha^{-1} at 15 DAS	34.97	2364	3276	76.14	83.21	61.85	79.61	82.27	65.45	18.14
T_3 - Propaquizafop POE @ 625 g a.i. ha^{-1} at 10-12 DAS	30.61	2305	3012	51.06	80.07	77.19	77.06	74.67	58.91	20.18
T_4 - Fenaxaprop-P-ethyl POE @ 75 g a.i. ha^{-1} at 10-12 DAS	31.57	2328	2907	90.40	92.08	78.16	69.00	75.13	60.40	19.39
T_5 - Chlorimuron ethyl POE @ 12 g a.i. ha^{-1} at 10-12 DAS	34.97	2441	3189	90.70	93.86	84.78	90.75	74.25	81.13	15.47
T_6 - Quizalofop ethyl POE @ 40 g a.i. ha^{-1} at 10-12 DAS	36.12	2471	3134	91.86	92.81	91.66	89.23	83.82	70.23	14.43
T_7 - Tank mix (Quizalofop ethyl POE @ 40 g a.i. ha^{-1} + chlorimuron ethyl POE @ 12 g a.i. ha^{-1}) at 20 DAS	37.13	2690	3325	88.42	90.44	93.34	93.99	84.95	80.57	6.85
T_8 - Imazethapyr POE @ 75 g a.i. ha^{-1} at 21 DAS	38.25	2705	3416	71.68	80.62	96.02	96.42	86.05	81.68	6.33
T_9 - Pendimethaline PE @ 750 g a.i. ha^{-1} + 1 HW at 30 DAS	38.66	2820	3503	77.63	82.97	97.10	97.23	89.40	85.55	2.35
T_{10} - Weed free check (2 HW + 2 Hoeing) at 3rd and 5th WAS	40.62	2888	3570	80.55	88.06	98.43	98.78	96.19	95.83	-
T_{11} - Farmers practice (1 HW + 1 Hoeing) at 30 DAS	37.00	2510	3296	86.93	88.25	87.75	95.09	78.45	81.58	13.08
T_{12} - Weedy check	28.62	1746	2700	-	-	-	-	-	-	39.54
S.E. ±	0.83	87.67	51.53	-	-	-	-	-	-	-
C.D. (P=0.05)	2.44	264.74	153.92	-	-	-	-	-	-	-
General mean	35.19	2465	3200	80.23	86.62	86.14	87.87	82.03	75.54	15.95

yield parameters for find out suitable post-emergence herbicide were studied in all 12 treatments that is number of pods plant^{-1}, seed yield kg ha^{-1}, straw yield kg ha^{-1}, weed control efficiency and weed index. These observations were recorded in 5 plants of each treatment per plot in each replication and their average mean values were used for statistical analysis.

RESULTS AND DISCUSSION

Data presented in Table 1 revealed that the treatment (T_{10}) weed free check (2 HW + 2 hoeing at 3rd and 5th WAS) recorded highest number of pods plant^{-1}(40.62)which was at par with (T_9) pendimethalin PE @ 750 g.a.i. ha^{-1}+1HW at 30 DAS and amongst post-emergence herbicides treatment (T_8) imazethapyr POE @ 75 g.a.i. ha^{-1} at 21 DAS (38.25). Treatment (T_{10}) weed free check (2 HW + 2 hoeing at 3rd and 5th WAS) recorded highest number of pods plant^{-1} (40.62), seed yield (2888 kg ha^{-1}), straw yield (3570 kg ha^{-1}) and weed control efficiency at 40 DAS and at harvest (monocot and dicot) *i.e.*, 98.43, 98.78 and 96.19, 95.93 per cent, respectively followed by treatment T_9 pendimethalin PE @ 750 g a.i.ha^{-1}+1 HW at 30 DAS, number of pods plant^{-1} (38.66), seed yield (2820 kg ha^{-1}), straw yield (3503 kg ha^{-1}) and WCE 97.10,97.23 and 89.40,85.55 per cent monocot and dicot at 40 DAS and at harvest, respectively. Weed index *i.e.,* lowest yield loss over weed free check was observed in treatment T_9 PE @ 750 g a.i.ha^{-1}+1 HW at 30 DAS (2.35%) and amongst the post emergence herbicides treatment (T_8) imazethapyr POE @ 75 g a.i.ha^{-1} at 21 DAS (6.33%). Study on post emergence herbicides for weed control in soybean rather than other weed control treatments revealed that, the treatment (T_8) imazethapyr POE @ 75 g a.i.ha^{-1} at 21 DAS recorded highest number of pods plant^{-1} (38.25),seed yield (2705 kg ha^{-1}), straw yield (3416 kg ha^{-1}), WCE 96.02, 96.42 and 86.05, 81.68 per cent monocot and dicot at 40 DAS and at harvest, respectively and weed index 6.33 per cent, which was followed by treatment (T_7) tank mix (Quizalofop ethyl POE @ 40 g a.i. ha^{-1} + chlorimuron ethyl POE @ 12 g a.i. ha^{-1}) at 20 DAS. number of pods plant^{-1} (37.13), seed yield (2690 kg ha^{-1}), straw yield (3325kg ha^{-1}), WCE 93.34,93.99 and 84.95,80.57 per cent monocot and dicot at 40 DAS and at harvest, respectively and weed index 6.85 per cent (Kolhe *et al.*,1998). Minimum observations on above yield parameters were recorded in treatment T_3 propaquizafop POE @ 625 g a.i. ha^{-1} at 10-12 DAS. From the present investigation, it is observed that most of the yield parameters were found at par in treatment (T_9) pendimethalin PE @ 750 g a.i. ha^{-1} + 1 HW at 30 DAS and treatment (T_8) imazethapyr POE @ 75 g a.i. ha^{-1} at 21 DAS with superior treatment (T_{10}) weed free check (2 HW + 2 hoeing at 3rd and 5th WAS). So imazethapyr was found effective as post emergence herbicide for weed control in soybean under Marathwada region. Similar work related to the present investigation was also carried by Kumar *et al*. (2008); Kushwah and Vyas (2005); Malik and Lal (1973) ; Muzik (1979); Rammoorthy *et al.* (1995) ; Rao (1987); Sharma and Raghuwanshi (1999); Tiwari *et al.* (1997) and Yaduraju (2002).

Conclusion :

Based on the experimental findings on the basis of one season data of experiment on "Evaluation of efficacy of post emergence herbicides in soybean [*Glycine max* (L.) Merill.] in Marathwada region" the following broad conclusion would be drawn.

Use of pendimethalin @ 750 g a.i. ha^{-1} + 1 hand weeding in case of pre emergence herbicides and among post emergence herbicides Imazethapyr POE @ 75 g a.i. ha^{-1} at 21 DAS and Tank mix (Quizalofop ethyl POE @ 40 g a.i. ha^{-1} + chlorimuron ethyl POE @ 12 g a.i. ha^{-1}) at 20 DAS was also found beneficial in comparison with the treatment weed free check *i.e.,* 2 HW + 2 hoeing at 3rd and 5th week after sowing.

Thus, the chemical weed control with the post emergence herbicides is good option where the labour availability is severe problem.

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