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Bio-Efficacy studies of metribuzin 70 Wg in soybean (*Glycine max* L.)

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Abstract
Field experiment was conducted during *kharif* season of 2016 at College of Agriculture, Ganjbasoda to evaluate the efficacy of metribuzin 70 WG against weed flora in soybean. Result indicated that all the treated plots significantly reduced the weed dry weight over untreated control. Highest weed control efficiency was recorded with treatment metribuzin 70 WG (Triazinone herbicide) @ 0.525 kg a.i/ha followed by metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha and metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha. Application of metribuzin 70 WG (Triazinone herbicide) @0.525 kg a.i/ha produced maximum seed yield followed by metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha, metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha

Keywords: Soybean, weed management, yield attributes

Introduction
Soybean (*Glycine max* L) is one of the important oilseed as well as leguminous crop. In India, it is grown on an area of 108.83 lakh ha with an annual production of 104.36 lakh million tones (SOPA, 2014) [14]. Soybean is an excellent health food containing 40 to 44% good quality protein, 20% cholesterol free oil, 20% carbohydrate and 0.69% phosphorous. It also fixes atmospheric nitrogen through root nodules and adds about 0.5 to 1.5 ton organic matter per hectare through leaf fall (Kanase *et al*., 2006) [9]. Soybean grows slowly during the initial period which results in to vigorous growth and proliferation of weeds. Weeds compete with crop for soil, moisture, nutrients, light, space etc. In *kharif*, the weed competition is one of the most important cause of low yield in oilseeds. In India, it was observed that weeds cause 45%, insect 30%, disease 20% and other pests 5% loss of agricultural production (Gupta and Anmol, 1997). Reduction in soybean yield due to weed infestation varies from 27 to 77% (Gogoi *et al*., 1991) depending on type of weed, soil resources and weed infestation intensities. Some have reported the yield decline as high as 84% (Kachroo *et al*., 2003) [8]. Weed infestation removed 21.4 kg N and 3.4 kg P/ha in soybean (Pandya *et al*., 2005) [12].
Manual weeding is effective but it is cumbersome, time consuming and uneconomical due to continuously increasing cost and unavailability of laborers during peak periods of crop cultivation, while mechanical means generally lead to root injury (Casarini *et al.*, 1996) [1]. In such circumstances, use of effective herbicides gives better and timely weed control. Pre-emergence herbicide application can help control weeds to some extent during the early crop growth stage. Soybean undergoes heavy weed competition especially in the early growth stages. Crop-weed competition is minimized by pre emergence herbicide spray, resulting in decreasing weed dry matter and increasing crop yield (Jeybal *et al*., 2001; Mohamed, 2004; Sha, 2004) [11, 13]. In view of above, a study on weed management in soybean with herbicides was taken up. Metribuzin is a broad spectrum herbicide with higher selectivity to soybean. Recently, new formulation of Metribuzin has been tested. However, its doses are to be tested for effective control of weeds in soybean crop.

Materials and Methods
Field experiment was carried out during *kharif* season of 2016 at College of Agriculture, Ganjbasoda. Ten treatments viz. Metribuzin 70 WP (Sample from imported technical) @ 0.350 and 0.525 kg a.i/ha, Metribuzin 70 WG (Triazinone herbicide) @ 0.175, 0.350, 0.385 and 0.525 kg a.i/ha, Metribuzin 70 WP (Market sample) @0.350 and 0.525 kg a.i/ha, Imazethapyr 10% SL @ 0.1 kg a.i/ha and untreated control were tested in randomized block

design with three replications. Soybean variety JS 95-60 was treated with bavistin @ 2.5 g/kg of seed and sown on 22nd July, 2016 at 35 cm apart using 100 kg seed/ha.

The crop was harvested on 16th October, 2016. Total rainfall received during the growing period of crop was 952.80 mm. All the herbicides were applied by manually operated knapsack sprayer fitted with flat nozzle using spray volume of 700 litre/ha. Metribuzin 70 WP and Metribuzin 70 WG were sprayed at 2 days after sowing as pre emergence wheras imazethapyr 10% SL was sprayed at 18 days after sowing (DAS) of soybean crop as post emergence. Weed population was recorded by using 0.25 m^2 quadrate at 60 DAS in all the treatments and then converted into number of weeds/m^2. The weeds were dried in oven till a constant weight was observed and then converted in to kg/ha. The data on total weed count was subjected to square root transformation (x + 0.5) to normalize their distribution (Gomez and Gomez, 1984). Weed control efficiency (Mani *et al*., 1973) was worked out by given formula

$$WCE = \frac{DWC\text{-}DWT}{DWC} \times 100$$

Where, WCE is weed control efficiency, DWC is dry weight of weed in control plot and DWT is dry weight of weed in treated plot

Results and Discussion

The experiment field was infested with grassy, broad leaf weeds and sedges. Among the grassy weeds, *Echinochloa crusgalli* (18.73 %) was most dominant weed. Dominant broad leaf weeds that invade the field were *Parthenium hysterophorous* (23.21 %), *Celotia argentia* (17.26 %) and other weeds (13.48 %). Besides, grassy and broad leaf weeds, *Cyperus rotundus* (27.32 %) was the only sedge present in the experimental field (Fig. 1). Data related to weed dry weight at harvest stage as affected by different treatments are given in Table 1. It is evident from the data that all the treated plots significantly reduced the weed dry weight over untreated control. Among the treated plots, the lowest weed dry weight was recorded under metribuzin 70 WG (Triazinone herbicide) @ 0.525 kg a.i/ha which was at par to metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha and metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha. Govindra Singh *et al.* (2001) reported drastic reduction in dry matter production of weeds at all the doses (0.350, 0.525 and 0.700 kg/ha) of metribuzin applied as pre-emergence or early post emergence. The highest weed dry weight was recorded under untreated control which was differed significantly with all the remaining treatments.

Table 1: Effect of metribuzin on weed dry weight and weed control efficiency

Treatment	Dose/ha (kg) a.i	Weed dry weight at harvest (kg/ha)	WCE (%)
Metribuzin 70 WP (Sample from imported technical)	0.350	149.8	68.15
Metribuzin 70 WP (Sample from imported technical)	0.525	141.9	69.82
Metribuzin 70 WG (Triazinone herbicide)	0.175	139.5	70.34
Metribuzin 70 WG (Triazinone herbicide)	0.350	137.1	70.85
Metribuzin 70 WG (Triazinone herbicide)	0.385	133.7	71.57
Metribuzin 70 WG (Triazinone herbicide)	0.525	126.5	73.09
Metribuzin 70 WP (Market sample)	0.350	170.1	63.81
Metribuzin 70 WP (Market sample)	0.525	162.7	65.40
Imazethapyr 10%SL	0.1	173.4	63.12
Untreated control	-	470.2	-
SEm±	-	3.08	-
C.D	-	9.01	-

Table 2: Effect of metribuzin on yield attributes and yield of soybean

Treatment	**Dose/ha (kg) a.i**	**Number of Pods/ plant**	**Number of Seeds/ pod**	**100- seed weight (g)**	**Grain yield/plant (g)**	**Yield (q/ha)**	**Yield increase over weedy check (q/ha)**
Metribuzin 70 WP (Sample from imported technical)	0.350	28.11	2.39	8.92	4.58	7.15	3.90
Metribuzin 70 WP (Sample from imported technical)	0.525	30.10	2.41	9.18	5.17	7.75	4.50
Metribuzin 70 WG (Triazinone herbicide)	0.175	30.33	2.42	9.21	5.28	8.50	5.25
Metribuzin 70 WG (Triazinone herbicide)	0.350	31.28	2.43	9.33	5.37	8.90	5.65
Metribuzin 70 WG (Triazinone herbicide)	0.385	32.56	2.44	9.67	6.42	9.65	6.40
Metribuzin 70 WG (Triazinone herbicide)	0.525	33.89	2.45	9.92	6.48	11.20	7.95
Metribuzin 70 WP (Market sample)	0.350	25.10	2.35	8.85	4.40	6.80	3.55
Metribuzin 70 WP (Market sample)	0.525	26.30	2.37	8.87	4.45	6.95	3.70
Imazethapyr 10%SL	0.1	24.50	2.35	8.80	4.38	6.75	3.50
Untreated control	-	18.17	2.32	8.50	3.42	3.25	-
SEm±	-	1.51	0.02	0.26	0.46	1.18	-
C.D	-	4.43	0.05	0.76	1.33	3.45	-

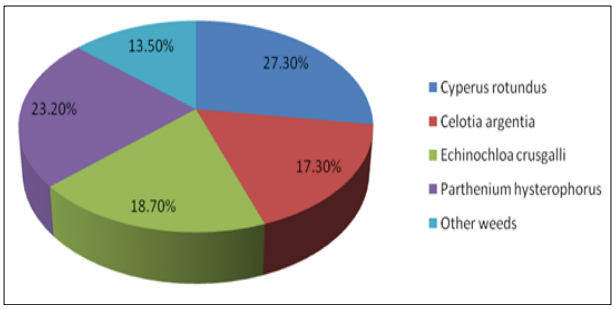

Fig 1: Relative density of dominant weeds in weedy check at 20 DAS

Among all weed control treatments, highest weed control efficiency was recorded with treatment metribuzin 70 WG (Triazinone herbicide) @ 0.525 kg a.i/ha followed by metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha and metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha. This could be due to lower weed population and weed dry matter.

Various yield components were markedly influenced by different weed control measures. Maximum number of pods/plant, number of seeds/pod, 100- seed weight and yield/plant was produced by metribuzin 70 WG (Triazinone herbicide) @ 0.525 kg a.i/ha which was at par to metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha, metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha, metribuzin 70 WG (Triazinone herbicide) @ 0.175 kg a.i/ha, metribuzin 70 WP (Sample from imported technical) @ 0.525 kg a.i/ha. Seed yield significantly varied due to different treatments. All the treated plots significantly produced higher seed yield than untreated control. This was due to better suppression of weeds, more availability of nutrients, production of higher crop growth and favorable influence on sink capacity and its effective translocation towards the maximum seed. The data of Table 2 revealed that application of metribuzin 70 WG (Triazinone herbicide) @0.525 kg a.i/ha produced maximum seed yield followed by metribuzin 70 WG (Triazinone herbicide) @ 0.385 kg a.i/ha, metribuzin 70 WG (Triazinone herbicide) @ 0.350 kg a.i/ha. Application of metribuzin at 0.7 kg/ha as pre-emergence reduced weed biomass and nutrient uptake by weeds and increased yields during rainy and winter seasons (Jeyabal *et al*., 2001). Untreated control produced lowest yield of soybean which was significantly inferior to different weed control treatments. Drastic yield reduction in untreated control was due to heavy infestation of weeds, especially broad leaved weeds which grow faster and suppressed the crop growth, thus causing reduced yields. The broad leaved weeds on an average contributed 53.95% of total weed population. Howe and Oliver (1987) [6] also reported reduced yield in weedy check due to higher density of weeds especially broad leaved weeds.

References

1. Casarini B, Poldini L, Silvestri G. Experimental studies on weed control in peas grown for processing. Industria Conserve. 1996; 3:15.
2. Gogoi AK, Kalita H, Pathak AK. Integrated weed management in soybean (*Glycine max* L.). Indian J Agron. 1991; 36(3):453-454.
3. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research (2nd edition). A Wiley-Interscience publication. John Wiley and Sons, New York, USA, 1984, 316-55.
4. Govindra Singh, Mishra OP, Singh R, Singh VP. Bio-efficacy of clomazone and metribuzin in soybean. Indian Journal of weed Science. 2011; 33(3-4):191-193.
5. Gupta GS, Anmol LA. Yield and nutrient uptake in maize as influenced by presence of weeds. Indian J Agron. 1997; 17(5):225-230.
6. Howe OWI, Oliver LR. Influence of soybean (*Glycine max*) row spacing on pitted morning glory (*Ipomea lacunole*) interferences. Weed Sci. 1987; 35:185-193.
7. Jeyabal A, Pallaniappan SP, Chelliah S. Efficacy of metribuzin and trifluralin on weed management in soybean (*Glycine max*). Indian Journal of Agronomy. 2011; 46(2):339-342.
8. Kachroo D, Dixit AK, Bali AS. Weed management in oilseed crop- a review. J Res. SKUAST- Jammu. 2003; 2(1):1-12.
9. Kanase AA, Mendhe SN, Khawale VS, Jarande NN, Mendhe JT. Effect of integrated nutrient management and weed biomass addition on growth and yield of soybean. J Soils Crops. 2006; 16(1):236-239.
10. Mani VS, Pandita ML, Gautam KC, Bhagwandas. Weed killing chemicals in potato cultivation. Indian farming. 1973; 23:7-13.
11. Mohamed SA. Effect of basagran herbicide and indole acetic acid (IAA) on growth, yield, chemical composition and associated weeds of soybean plants. Egypt J Appl. Sci. 2004; 19(10):79-91.
12. Pandya N, Chouhan GS, Nepalia V. Effect of varieties, crop geometries and weed management on nutrient uptake by soybean (*Glycine max*). Indian J Agron. 2005; 46(2):339-342.
13. Sha HZ. Test on the efficacy of 40% emulsifiable concentrate of prometryn and acetochlor against soybean weeds. J Jilin Agric. Univ. 2004; 26(4):452-454.
14. The Soybean Processors Association of India (SOPA). Estimates of area, productivity and production of soybean in India during kharif, 2014.