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Theme 2. Grassland production and utilization

Sub-theme 2.2. Integration of plant protection to optimise production

## Efficacy of different herbicides on weed flora of berseem (*Trifolium alexandrium L.*)

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\*Corresponding author e-mail: [vinod.wasnik01@yahoo.com](mailto:vinod.wasnik01@yahoo.com)**Keywords:** Berseem, Herbicides, Weed control, fodder and seed yield

### Introduction

Berseem is one of the prominent winter legume fodder crops. It has 20-24% crude protein and 70% digestible dry matter. Common weeds found in berseem are *Cichorium intybus*, *Cornopus didimus*, *Spergula arvensis*, *Chenopodium album*, *Rumex dentatus* and some grass family weeds. Weeds compete with main crop for essential plant nutrients, light, moisture and space. They not only deteriorate fodder quality but also decrease fodder and seed yield. Weed infestation reduces normally 25-35% green fodder and seed yield. It is the major challenge to control the berseem weeds for enhancement of productivity and quality of fodder and seed yield. Hence the present investigation is undertaken to study the efficacy of some herbicides for berseem weed management.

### Materials and Methods

A field experiment was carried out during Rabi season of 2013-14 and 2014-15 at central research farm of Indian Grassland and Fodder Research Institute, Jhansi to test the efficacy of different herbicides against weed flora of berseem. The study was arranged in randomized block design and replicated thrice. Ten herbicide treatments *viz.*, oxyfluorfen and pendimethalin as pre-emergence and imazethapyr as post emergence with 0.05, 0.075, 0.1 kg a.i. /ha and a combination of pre-emergence and post-emergence with oxyfluorfen and imazethapyr @ 0.05 kg a.i. /ha respectively were tested in comparison with weed free (hand weeding) and weedy check (zero weeding). Berseem variety 'Wardan' was sown in the experimental field with recommended package of practices. Fertilizers were applied uniformly through urea, single super phosphate and muriate of potash @ 20 kg N, 80 kg P<sub>2</sub>O<sub>5</sub> and 40 kg K<sub>2</sub>O/ha, respectively. Data on weed growth and crop yield performance were recorded.

### Results and Discussion

Herbicidal treatments significantly influenced the population and dry matter production of weeds. Among herbicidal treatments, the lowest weed density (11weeds/m<sup>2</sup>) was observed under imazethapyr application at 20 days after sowing @ 0.1 kg a.i. /ha, followed by Oxyfluorfen as pre-emergence and Imazethapyr as post-emergence (30 days after sowing) application @ 0.05 kg a.i. /ha (13 weeds/m<sup>2</sup>) (Table 1). Significant reduction in weed dry weight was observed in these two treatments compared to others. These results are in conformity with the findings of Kumar and Shivadhar (2008). Significantly more number of tillers at maturity was recorded in weed free (805/m<sup>2</sup>) and imazethapyr @ 0.1 kg a.i. /ha application compared to weedy check. This indicates that weed controlling operations favour the growth of plants for maximum tiller production. The highest green fodder (464.3 q/ha) and straw yield (20.4 q/ha) was recorded in weed free plot. These results were in agreement with the findings of Pathan et al. (2013). Among herbicidal treatments, imazethapyr application @ 0.1 kg a.i. /ha recorded maximum green fodder (439.9 q/ha) and seed yield (3.4 q/ha), which were significantly superior compared to other treatments. Among different herbicide treatments maximum weed control efficiency (96.7%) was recorded with imazethapyr application (0.1 kg a.i. /ha) as post-emergence herbicide in berseem crop (Fig.1).

**Table 1:** Weed growth, fodder and seed yield of berseem as influenced by different weed control treatments

Treatment	Dose (kg a.i./ha)	Application time	Weed density at 55 DAS (No./m <sup>2</sup> )	Weed dry weight at 55 DAS (g/m <sup>2</sup> )	Plant height at harvest (cm)	Tillers at maturity (No./m <sup>2</sup> )	Yield (q/ha)			Weed control efficiency
							Green fodder	Seed	Straw	
Oxyfluorfen	0.05	Pre-em	9.3 (86)*	3.1(10.01)*	74.6	713	352.2	2.5	18.1	73.9
Oxyfluorfen	0.075	Pre-em	10.8 (117)	3.3 (11.17)	72.7	636	374.1	2.5	17.6	64.4
Oxyfluorfen	0.100	Pre-em	12.0 (144)	4.6 (21.0)	68.2	417	323.0	2.8	17.4	56.2
Pendimethalin	0.05	Pre-em	12.7 (162)	4.4 (19.83)	76.3	711	401.1	2.7	17.2	50.8
Pendimethalin	0.075	Pre-em	12.7 (162)	4.2 (17.83)	77.2	633	372.7	2.5	18.3	50.7
Pendimethalin	0.100	Pre-em	14.4 (206)	4.3 (18.17)	71.3	596	424.5	2.5	17.9	37.4
Imazethapyr	0.05	Post-em	4.1 (17)	1.6 (2.53)	85.1	660	433.7	2.7	16.3	94.8
Imazethapyr	0.075	Post-em	3.9 (15)	1.2 (1.37)	78.6	742	409.9	3.2	16.0	95.4
Imazethapyr	0.100	Post-em	3.4 (11)	1.0 (1.0)	84.1	793	439.9	3.4	17.6	96.7
Oxyfluorfen - Imazethapyr	0.05-0.05	Pre-em-Post-em (30 DAS)	3.6 (13)	1.1 (1.32)	86.7	550	372.7	2.8	15.6	96.0
Weed free	-	-	-	-	86.0	805	464.3	2.9	20.4	100
Weedy	-	-	18.1(329)	5.5 (30.13)	73.6	721	383.7	2.6	18.9	-
CD(0.05)	-	-	0.36	0.52	NS	27.33	45.07	0.07	1.32	-

\*Values in parenthesis are square root transformed.



**Fig. 1:** Weedy check and Imazethapyr (0.1 kg a.i./ ha) treated plots of berseem at 50 days after sowing.

### Conclusion

Weed free situation helps in enhancing the green fodder as well as seed yield in berseem crop. The application of imazethapyr @ 0.1 kg a.i./ha 20 days after sowing has 96.7% weed control efficiency and thereby enhanced green fodder and seed yield in berseem which are on par with weed free check.

### References

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