

Evaluation of Bentazon and its Ready Mix Formulation with Blazer for Weed Control in Soybean

V. P. Singh, Govindra Singh and Mahendra Singh

Department of Agronomy

G. B. Pant University of Agriculture & Technology, Pantnagar-263 145 (Uttaranchal), India

ABSTRACT

There was no control of *Echinochloa colona* due to application of bentazon, blazer or their ready mix formulation. Bentazon applied alone or in combination with blazer caused drastic reduction in the density of *Celosia argentea*, *Trianthema monogyna* and *Cleome viscosa*. Bentazon as follow up application over pre-plant incorporation of fluchloralin provided effective control of both grasses and non-grasses. The lowest weed dry matter production was recorded in plots treated with fluchloralin followed by bentazon or bentazon+blazer. Grain yields were significantly higher due to the bentazon at 720, 1200 and 2400 g ha⁻¹ than at 540 g ha⁻¹.

INTRODUCTION

Soybean yields due to weed infestation have been found to be reduced to the extent of 20-77% (Kurchania *et al.*, 2001) depending upon the density, species of weeds and duration. In soybean fields, the major weed species observed are *Echinochloa colona*, *Dactyloctenium aegyptium*, *Eleusine indica*, *Celosia argentea*, *Commelina benghalensis*, *Trianthema monogyna*, *Cucumis trigonus* and *Cyperus* spp. Alachlor, pendimethalin and fluchloralin have been recommended for weed control in soybean. These herbicides provide effective control of annual grasses in soybean. There are reports that continuous use of these herbicides results in development of non-grasses weeds and sedges in soybean which become very serious. In view of these facts, the alternative herbicides may be developed, which may provide wide weed control spectrum applied alone or in combination with other herbicides. So, the present investigation was carried out to evaluate bentazon and its ready mix formulation with blazer for weed control in soybean.

MATERIALS AND METHODS

Field experiment was conducted during rainy seasons of 1999 and 2000 at the Crop Research

Centre of G. B. Pant University of Agriculture & Technology, Pantnagar to assess weed control spectrum, weed control efficacy of bentazon alone and in combination with blazer as ready mix formulation (Galaxy) and follow up application over pre-plant application of fluchloralin. The soil of experimental field was loamy in texture (38.4% sand, 45.2% silt and 16.4% clay), medium in organic carbon (0.58%), very high in available phosphorus (104 kg ha⁻¹) and medium in available potassium (201 kg ha⁻¹) content with pH 7.7. Experiment was laid out in randomized block design with four replications. The details of the treatments are given in Table 1. Bentazon and ready mix formulation of bentazon and blazer were applied at 20 days after soybean sowing (DAS), trifluralin (second season only) and fluchloralin were applied as pre-plant incorporation. All the herbicides were applied as spray at 500 litre per hectare spray volume. Soybean variety PK 564 at spacing of 60 cm was sown on July 5, 1999 and July 7, 2000. Recommended package of practices other than weed control was followed to grow the experimental crop.

RESULTS AND DISCUSSION

Effect on Weeds

The experimental field was infested with

Echinochloa colona (27.2%), *Celosia argentea* (25.0%), *Trianthema monogyna* (16.3%), *Cyperus rotundus* (14.7%), *Cleome viscosa* (9.8%) and others (7.1%)—*Dactyloctenium aegyptium*, *Eleusine indica*, *Cucumis trigonus* and *Commelina benghalensis*. Bentazon, blazer and ready mix formulation of bentazon and blazer (Galaxy) were not effective in controlling *E. colona* (Table 1). Trifluralin and fluchloralin were very effective against *E. colona* but ineffective on non-grassy weeds and *C. rotundus* and *C. argentea*. *T. monogyna* and *C. viscosa* were effectively controlled by bentazon applied alone or as ready mix formulation with blazer. Weed control efficacy of bentazon at 540 g ha⁻¹ was less than its higher doses. Weed control spectrum was widened due to follow up application of bentazon over pre-plant incorporation of fluchloralin where grassy as well

as non-grassy weeds were controlled well. There was reduction in the weed dry matter production due to all the treatments when compared with weedy check (Table 2). There was more weed growth in terms of weed dry weight in plots treated with fluchloralin and trifluralin in comparison to other treatments. This was mainly due to non-control of non-grassy weeds. Weed dry weight did not differ much due to bentazon at 720 g ha⁻¹ and higher doses when compared with that of ready mix formulation of blazer. Fluchloralin superimposed with bentazon or with blazer had lowest weed dry matter production.

Effect on Crop

None of the treatments had any phytotoxic effects on soybean crop. There was more than 82%

Table 1. Effect of bentazon and blazer on weeds in soybean (Mean of two crop seasons)

Treatment	Dose (g ha ⁻¹)	Weed density (No. m ⁻²) 45 DAS					
		<i>E. colona</i>	<i>C. argentea</i>	<i>T. monogyna</i>	<i>C. rotundus</i>	<i>C. viscosa</i>	Others
Bentazon	540	25	9	10	8	2	4
Bentazon	720	23	2	5	6	1	2
Bentazon	1200	28	0	2	2	1	4
Bentazon	2400	23	0	1	3	1	1
Bentazon+Blazer	540+120	20	4	12	8	0	3
Bentazon+Blazer	720+160	25	0	2	10	0	1
Bentazon+Blazer	1440+320	24	0	2	3	0	2
Blazer	120	29	20	9	13	2	4
Blazer	160	23	18	8	15	3	4
Trifluralin	1200	3	14	19	17	7	2
Trifluralin	2400	0	17	21	19	9	0
Fluchloralin	960	4	21	13	16	11	6
Fluchloralin fb	960 fb	2	0	2	4	2	6
bentazon	960						
Fluchloralin fb	720 fb	5	0	0	5	0	3
bentazon+	720+						
Blazer	160						
Weed-free	-	0	0	0	0	0	0
Weedy	-	25	23	15	13	9	7

Table 2. Effect of bentazon and blazer on weed dry weight and soybean yield

Treatment	Dose (g ha ⁻¹)	Total weed dry weight (g m ⁻²) 45 DAS			Grain yield (kg ha ⁻¹)		
		1999	2000	Mean	1999	2000	Mean
Bentazon	540	25.2	28.6	26.9	1300	2017	1659
Bentazon	720	18.7	21.0	19.9	1586	2218	1902
Bentazon	1200	14.1	15.6	14.9	1610	2392	2001
Bentazon	2400	19.6	13.2	10.4	1560	2387	1974
Bentazon+Blazer	540+120	18.5	20.7	19.6	1584	2256	1920
Bentazon+Blazer	720+160	17.8	15.6	16.7	1605	2315	1960
Bentazon+Blazer	1440+320	19.2	14.3	16.8	1600	2305	1953
Blazer	120	31.0	33.6	32.3	1385	1856	1621
Blazer	160	30.2	29.7	30.0	1410	1978	1694
Trifluralin	1200	-	155.2	155.2	-	1203	1203
Trifluralin	2400	-	140.3	140.3	-	1387	1387
Fluchloralin	960	150.6	153.7	152.2	685	1138	912
Fluchloralin fb bentazon	960 fb 960	2.8	5.2	4.0	1895	2707	2301
Fluchloralin fb bentazon+ Blazer	720 fb 720 + 160	1.6	2.7	2.2	1900	2778	2339
Weed-free	-	0.0	0.0	0.0	1890	2815	2353
Weedy	-	312.6	317.8	315.2	315	517	416
LSD (P=0.05)	-	11.7	12.5	-	252	307	-

loss to grain yield of soybean in weedy check in comparison to weed-free treatment (Table 2). Grain yields were significantly more in all the herbicide treated plots when compared with weedy plots. Grain yields were very much low in plots treated with fluchloralin or trifluralin alone mainly due to huge growth of *C. argentea* in these plots. Grain yields were significantly higher due to bentazon at 720, 1200 and 2400 g ha⁻¹ than at 540 g ha⁻¹ which caused reduction in weed dry matter mainly due to the control of *C. argentea*. Grain yields due to the

higher doses of bentazon and blazer were at par among themselves. Fluchloralin at 960 g ha⁻¹ or bentazon at 720 g ha⁻¹+ blazer at 160 g ha⁻¹ being at par yielded similar to weed-free and significantly higher than other treatments.

REFERENCE

- Kurchania, S. P., G. S. Rathi, C. S. Bhalla and R. Mathew, 2001. Bio-efficacy of post-emergence herbicide for weed control in soybean [*Glycine max* (L.) Merr.]. *Indian J. Weed Sci.* **33** : 34-37.