Sarhad J. Agric. Vol. 17 (3), 2001

EFFECT OF VARIOUS WEED CONTROL METHODS ON THE PERFORMANCE OF CANOLA

Muhammad Arif, Ihsanullah and Sherin Khan

ABSTRACT

An experiment to study the effect of various chemical and conventional weed control methods on the performance of canola was conducted at the Agricultural Research Farm of NWFP Agricultural University, Peshawar during winter 1999-2000. The experiment was laid out in randomized complete block design with four replications. Minimum weeds per m2 (1.50) were observed in plots to which isoprotron 75 WP at the rate of 520 g per acre was applied. Plant height (161.8cm), number of pods per plant (609.9), number of grains per pod (28), 1000 grain weight (4.415g) and grain yield (1595 kg/ha) were maximum for plots applied with isoprotron 75 WP at the rate of 520 g per acre as pre-emergence herbicide. It is concluded that isoprotron 75 WP was the most effective herbicide for the control of most of the weeds as compared to other herbicides and conventional methods of weed control

INTRODUCTION

Canola (*Brassica napus L.*) belongs to family Cruciferae. Technically there are two different types of rapeseeds i.e. Brassica campestris and Brassica napus. The canola under study originated from Brassica napus and has less than 2% erucic acid and meal has less than 30 ug of glucosinolates. It contains 40-45% oil and 36-40% protein (Salman, 2000).

Efficient weed control is basic to efficient and profitable agriculture. Weeds injure crops very slowly and in subtle ways. "Good" farmers commonly lose 10-25% of crop yields because of weed infestation. Farmers using poorer weed control methods easily lose 25-50% of their crops. Yet losses due to weeds are seldom viewed as catastrophic. Infact they're often excused as due to bad weather, poor soil, poor seed, poor season, and so forth (Masood, 1998).

For centuries man fought weeds with his hands, sharp sticks, and hoes. Only recently has man used animal powered cultivators and mechanical power. Sea salt was probably the first chemical used to kill plant life. About 1900 purified chemicals were used for selective weed control. Wide-scale use of selective herbicides began in 1947, after the discovery of 2,4-D [2,4-dichlorophenoxy acetic acid] (Hudson, 1981).

Keeping the feasibility of different weed control methods in view, the present study was conducted to screen out best weed control method in canola and thereby maximizing its yield per unit area.

MATERIALS AND METHODS

To study the effect of various weeds control methods on the performance of canola an experiment was conducted at the Agricultural Research Farm of NWFP Agricultural University during winter 1999-2000. The experiment was laid out in randomized complete block design having four replications. Plot size of 4.5m x 3m with row to row distance 45 cm was used. All weed control methods, including chemical and conventional methods, were randomly arranged in each replication.

The following weed control methods were studied in the experiment.

1. Stomp 330EC (1 liter/acre)
2. Sencor WP70 (260g/acre)
3. Isoproton 75 WP (520g/acre)
4. Primextra 500 FW (1.5 litres/acre)
5. Triflon 4 EC (1.2 litre/acre)
6. Weeding with Khurpa
7. Hand pulling
8. Harvesting with sickle
9. Hand hoe
10. Weedy check (control)

Data were recorded on the following parameters :

1. Weeds per m^2 (60 days after emergence)
2. Plant height (cm)
3. Number of pods per plant
4. Number of grains per pod
5. 1000 grain weight (g)
6. Grain yield (kg/ha)

RESULTS AND DISCUSSION

Weeds per m^2

Weeds were minimum (1.50 per m^2)for isoprotron 75 WP treated plots (Table-I). This showed the superiority of isoprotron 75 WP over the other herbicides and weed control methods. Majority of the weeds were dicot while, some were monocot.

Department of Agronomy, NWFP Agricultural University, Peshawar - Pakistan.

In monocots, Phalaris minor was more frequent. Some common weeds abound in the field were the following.

Dicot weeds:

Botanical name	*Family Name*
Rumax acutus	Chenopodiaceae
Convolvuius arvensis	Convolvulaceae
Euphorbia helioscopa	Euphorbiaceae
Ammi visnaga	Umbelliferae

Monocot Weeds	*Family Name*
Cynodon dectylon	Poaceae
Cyperus rotundus	Cyperaceae
Phalaris minor	Poaceae

Isoprotron was effective against most of winter broad leaf weeds and phalaris minor and the same is reported by Mehra et al (1989). They had also showed similar results.

Plant Height

Tallest plant (161.8 cm) was recorded in treatments to which isoprotron 75 WP at the rate of 520 kg per acre was applied as a pre-emergence herbicide (Table-II). The results have similarity with those of Raghavan and Hariharan (1991).

Number of Pods per Plant

Number of pods per plant is an important yield component. Maximum number of pods per plant (609.9) was noted in Isoprotron 75 WP treated plots while, minimum number of pods per plant (418.9) was recorded in Triflon 4 EC treated plots (Table-III). The inhibitive effect of Triflon 4 EC on the performance of canola might have affected the formation of pods per plant. Raghavan and Hariharan (1991) using pre-emergence chemical also recorded the increase in number of pods per plant.

Number of Grains per Pod

Maximum grains per pod (28.00) were recorded for Isoprotron 75 WP treatment (Table-IV). As competition between plants and weeds for nutrients, moisture, and space was minimized due to effective weeds control by Isoprotron 75 WP, it ensured the presence of optimum availability of nutrients in the soil. The result has similarity with those of Raghavan and Hariharan (1991) who stated that pre-emergence herbicide increase number of seed setting per pod.

Thousand Grains Weight

Grain weight is an important component which, contribute to the grain yield. Grains attained maximum weight (4.415 g) in plots treated with Isoprotron 75 WP (Table-V). The probable reason might be better translocation of assimilates towards the sink (grain) as nutrients were plentiful due to the effective control of weeds by Isoprotron 75 WP. Minimum grains weight (4.148 g) was recorded for Triflon 4 EC treated plots. This might be due to the abundance of weeds in Triflon 4EC treated plots, as Triflon 4 EC did not properly control weeds. 4 EC might be its inhibitary effect on canola performance as observed during the course of experiment. The result is supported by Raghavan and Hariharan (1991), who observed increase in dry weight of 100 seeds (from 0.448 to 0.486 g) by using pre-emergence herbicide, while toxicity of herbicide is supported by Blackshaw and Derkson (1992). They had mentioned that DPX-A788 injures the plants to some extent.

Grain Yield

Grain yield is the main component in which one should be interested. Grain yield (1595 kg/ha) was highest in plots treated with Isoprotran 75EC and these are the precursor for the final yield, so maximum grain was noticed. Minimum grain yield (911.5 kg/ha) was recorded for plots in which weeds were controlled by Triflon 4 EC. This might be due to the presence of plenty of weeds in plots treated with Triflon 4 EC, which retarded the growth of canola plants by sharing moisture, nutrients and space with canola plants. These results are in conformity with Mehra et al. (1989) who also reported high yield from the weed control with Isoprotron, while the minimum grain yield was obtained from the treatments of Triflon 4 EC. Blackshaw and Harker (1992) got reduced seed yield of canola in one out of 4 trials with different chemicals.

Table I *Weeds/m^2 as affected by different weed control methods in canola.*

	Weed control Methods	Weeds/m^2
1	Stomp 330 EC	7.75 b
2	Sencor WP 70	5.25 bc
3	Isoprotron 75 WP	1.50 d
4	Primextra 500 FW	4.25 c
5	Triflon 4 EC	7.75 b
6	Weeding with Khurpa	5.50 bc
7	Hand pulling	4.25 c
8	Harvesting with sickel	5.50 bc
9	Hand hoe	3.00 cd
10	Weedy check	18.50 a

LSD value at 5% = 2.457, Mean followed by different letters are significantly different at 5% level according to Duncan's Multiple Range (DMR) test.

Table II *Plant height (cm) and number of pods/plant as affected by different weed control methods in canola.*

	Weed control Methods	Plant height (cm)	Number of pods/plant
1	Stomp 330 EC	145.2c	475 8de
2	Sencor WP 70	145.5c	495.5cd
3	Isoprotron 75 WP	161.8c	609.9a
4	Primextra 500 FW	139.4d	425.8f
5	Triflon 4 EC	135.7e	418.9f
6	Weeding with Khurpa	156.9b	518.0c
7	Hand pulling	157.1b	530.6bc
8	Harvesting with sickel	155.9b	511.1cd
9	Hand hoe	157.0b	563.9b
10	Weedy check	144.3c	444.9ef
LSD VALUE AT 5% =		1.976	37.03

Mean followed by different letters are significantly different at 5% level according to Ducan's Multiple Range (DMR)test.

Table III *Number of grains/pod and 1000 grain weight (g) as affected by different weed control methods in canola.*

	Weed control Methods	Plant height (cm)	Number of pods/plant
1	Stomp 330 EC	24.14cd	4.225c
2	Sencor WP 70	24.69bcd	4.225c
3	Isoprotron 75 WP	28.00a	4.415a
4	Primextra 500 FW	23.17de	4.145d
5	Triflon 4 EC	21.83e	4.148d
6	Weeding with Khurpa	25.63bc	4.341b
7	Hand pulling Harvesting with sickel	25.64bc	4.352ab
8	Hand hoe	25.17bc	4.332b
9	Weedy check	26.30b	4.365ab
10		24.14cd	4.247c
LSD VALUE AT 5%=		1.530	0.0648

Mean followed by different letters are significantly different at 5% level according to Ducan's Multiple Range (DMR) test.

Table IV ***Biological yield (kg/ha) and grain yield (kg/ha) as affected by different weed control methods in canola.***

	Weed control Methods	Biological Yield (kg/ha)	Grain Yield (kg/ha)
1	Stomp 330 EC	14350d	1196e
2	Sencor WP 70	14510d	1304d
3	Isoprotron 75 WP	16710a	1595a
4	Primextra 500 FW	11550e	1015g
5	Triflon 4 EC	10370f	911.5h
6	Weeding with Khurpa	15360bc	1475b
7	Hand pulling Harvesting with sickel	15390bc	1498b
8	Hand hoe	14890cd	1428c
9	Weedy check	15730b	1510b
10		12020e	1078f
LSD VALUE AT 5%=		683.7	45.51

Mean followed by different letters are significantly different at 5% level according to Ducan's Multiple Range (DMR)test.

REFERENCES CITED

Blackshaw, R.E. and D.A. Derkson. 1992. Response of cultivated mustard species to DPX-A7881. Canadian J. of Plant Sci. 72(1):203-207. Field Crops Abstracts 045-073665. 1992.

Blackshaw, R.E. and K.N. Harker. 1992. Combined potemergence of grass and broadleaf weed control in canola (Brassica napus). Weed Tech. 6 (4): 892-897. Weed Abstracts 042-02071; 6T. 1993.

Hudson, T.H., J.F. Flocker and M.K. Anton. 1981. PP 240-243. Plant Science. Prentice-Hall, Inc. Englewood Cliffs, New Jersy 07632.

Mehra, S.P., R.S. Kanwar and R.K. Bhatia. 1989. Herbicidal control of winter weeds in utumn cane + Indian mustard intercropping system. Indian. J. Weed Sci. 21 (3-4): 37-41.

Nilsson, H. and E. Hallgren. 1991. White mustard meal as a herbicide for control *Matricaria inodora*. A greenhouse experiment. Swedish Crop Protection Conference Weeds and Weed Control No.32: 157-161. Weed Abstracts 041-03514. 1992.

Raghavan, K. and M. Hariharan. 1991. Effect of 2,4-D pre-sowing seed treatment on growth and yield *Brassica iunceae L.* Cosson. Acta Botanica Indica. 19 (1): 13-17. Weed Abstracts 041-01809. 1991.

Salman, A. 2000. Role of germplasm in oil seed Crops. Special Problem Assign; Deptt of P.B.G, Agric. Uni. Peshawar.