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Effect of Weed Control and Fertilization on Yield Attributes and Seed Yield of Mustard (*Brassic juncea* L.) under Western Plains of UP

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Abstract

A field experiment was conducted on Indian mustard (*Brassic juncea* L.) cv Bio-902 during the winter season of 2003-2004 to evaluate three herbicide applications (pendimethalin, fluchloralin and oxadiazon) with four fertilization levels of NPS (control, 50, 75 and 100%). All herbicides resulted in significantly reduced density and dry matter of weeds infesting crop of Indian mustard. Weed control also reduced nutrient losses caused due to heavy weed infestation. Pre emergence application of oxadiazon 0.50 kg/ha, pendimethalin 0.75 kg/ha and pre-plant incorporation of fluchloralin 0.75 kg/ha increased seed yield by 67.3, 49.8 and 36.9% over the weedy check. Application of 80 + 40 + 40 kg NPS/ha increased the seed yield by 64.09% over control. Weed density, dry matter and nutrient removal by weed also increased significantly with higher fertilization levels.

Key words : Herbicides, Fertilization, Indian mustard, Yield.

Agro-climatic conditions of western UP are so favorable for production of Indian mustard that its maximum potential could be achieved if weeds are managed timely. In Indian mustard weeds caused maximum damage at the initial 20—40 DAS (1). In general, weeds resulted in reducation of Indian mustard yield up to 30—35%. Weed removal by manual method is costly and cumbersome. Nutrient management plays a key role in augmenting the oilseed productivity. Therefore the present investigation was carried out to find out a suitable weedicide and fertilization level to boost the productivity of Indian mustard.

Methods

A field experiment was conducted during the winter season of 2003-2004 at lglas, Aligarh. Soil of experimental site was well drained, alluvial with pH 7.8, along with low organic carbon 0.20%, low available nitrogen (118 kg/ha) and sulfur (17.48 kg/ha) and medium available phosphorus (13.4 kg/ha) and potash (224 kg/ha). The experiment was laid out in factorial randomized block design with four replications. Sixteen treatment combinations consisting of four weed control (weedy check, pendimethalin 0.75, fluchloralin 0.75 and oxadiazon 0.50 kg/ha) and four fertilization levels (0, 50, 75 and 100% RFD of NS.

The herbicides were sprayed with knap-sac sprayer fitted with flat fan nozzle, using 600 liters water/ha. A uniform dose of 40 kg K_2O/ha was given to the crop. N, P and S were drilled in crop rows based on treatment through urea, DAP and finely ground gypsum, respectively.Sowing of Bio-902 variety was done on 18 October 2003 with a row spacing of 45 cm using 5 kg seed/ha. The crop was harvested in first week of March 2004.

Results and Discussion

The prominent weed species of the experimental field were lambs quarter (*Chenopodium album* L.), goose foot (*Chenopodium murale* L.), sweet clover (*Melilotus indica* L.), swinecress (*Coronopus didymus* (L.) Sm.), corn spurry (*Spergula arvensis* L.), Scarlet pimpernel (*Anagallis arvensis* L.), Carrot grass (*Parthenium hysterophorus* L.) and small canary grass (*Phalaris minor* Retz.).

All the weed control treatments reduced the weed density and dry weight of weed significantly in comparision to weedy check. Oxadiazon application was found to be superior to all other treatments in reducing weed density and dry weight. Nutrient losses caused due to weed infestation reduced significantly

Table 1. Effect of weed control and fertilization on weed dry matter, nutrients removal by weeds, yield attributes and yield of Indian mustard.* $\sqrt{X + 0.5}$ transformed values. Data in parentheses are original values.

Treatments	Weeds/0.25m 30DAS	60DAS	Weed dry matter g/ 0.25m^2	Nutrient removal by weeds (kg/ha) N	P	K	S	Siliquae/ plant	Seeds/ siliqua	Test weight (g)	Seed yield q/ha
Weed Control											
Weedy check	6.50* (41.78)	7.26 (52.25)	713.86	41.21	3.36	13.49	1.31	243.83	12.99	4.92	11.75
Pendimethalin	4.97 (24.25)	5.17 (26.24)	366.95	7.72	1.85	7.54	0.74	264.89	14.81	5.48	17.60
Fluchloralin	5.85 (33.73)	5.75 (32.54)	410.67	5.74	2.08	8.06	0.81	262.54	14.23	5.86	16.09
Oxadiazon	4.44 (19.23)	2.85 (7.61)	176.45	3.83	1.02	3.63	0.37	285.97	15.45	5.85	19.66
CD (P = 0.05)	0.34	0.43	20.37	0.39	0.25	0.34	0.025	18.03	0.64	0.21	1.16
Fertilization (kg/ha)											
Control	5.35 (28.17)	5.38 (28.44)	361.78	6.92	1.80	7.26	0.70	226.98	12.20	4.67	12.20
50% RFD of NPS	5.45 (29.24)	5.51 (29.85)	394.31	7.65	1.99	7.82	0.78	258.79	13.95	5.29	15.29
75% RFD of NPS	5.55 (30.32)	5.48 (29.54)	431.29	8.19	2.18	8.52	0.84	271.81	15.23	5.71	17.59
100% RFD of NPS	5.64 (31.28)	5.60 (30.90)	480.54	8.72	2.33	9.12	0.91	294.64	16.10	5.95	20.02
CD (P = 0.05)	0.34	0.43	20.37	0.39	0.25	0.34	0.025	18.03	0.64	0.21	1.16

with application of weed control treatments. Oxadiazon saved more nutrient loss by weeds, followed by pendimethalin and fluchloralin, respectively. The uncontrolled weeds affect the crop adversely. The crop produced less siliquae/plant,seeds/siliqua and test weight. These ill-effect may be probably due to the competitive stress for available resources to be shared by the crop and weeds. The seed yield of mustard was significantly increased owing to the effect of weed control treatments (2). The seed yield of mustard was significantly increased owing to the effect of weed control treatments might be due to effective control of weeds under these treatment minimized the losses caused by weed growth thereby leading to improvement in yield attributes and enhancement in crop yield. The weedicide oxadiazon proved superiority over other treatments. The results are in close agreement with those of Nepalia and Jain (3).

Fertilization levels significantly increased the number of seeds per 0.25 m^2 at both the stages and weed dry weight. Marked influence of fertilization also observed on nutrients removal by weed. This might be due to vigorous weed growth and more availability of nutrients. All the yield attributes except siliquae/plant, increased significantly up to higher fertilization level. Higher fertilization level (80 : 40 : 40 kg NP S/ha) significantly influenced siliquae/plant, however, 60 : 30 : 30 kg and 40 : 20 : 20 kg NPS/ha found statistically at par to each other. Fertilization levels also significantly enhanced seed yield. It accounted for 64, 31 and 14% increase in yield over no, 50% and 75% of RFD. The result confirm the findings of Singh and Meena (4) and Mishra and Kurchania (5).

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