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Response of weed management practices on growth and yield of Indian mustard [*Brassica juncea* (L.) Czern & Coss]

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Abstract
A field experiment entitled "Effect of Weed Management Practices on Growth, Yield and Quality of Indian Mustard [*Brassica juncea* (L.) Czern & Coss]" was carried out during 2024-25 in *rabi* season at the Agronomy Research Farm, School of Agricultural Sciences, Jaipur National University, Jaipur, Rajasthan. Soil of the experimental field was sandy in texture having pH 7.58, organic carbon (OC) (0.43%), available nutrient (nitrogen 217.30 kg ha^{-1}; phosphorus 20.28 kg ha^{-1} and potassium 219.20 kg ha^{-1}). The experiment was laid out in randomized block design with three replications. The field trial consisted 09 treatments combinations *viz*., (i) Weedy check, (ii) Hand weeding once at 20 DAS, (iii) Pendimethalin at 0.75kg ha^{-1}, (iv) Pendimethalin at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS, (v) Oxadiargyl at 0.75kg ha^{-1} (PE), (vi) Oxadiargyl at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS, (vii) Fluazitfop-p-ethyl at 75ml ha^{-1} (EPOE), (viii) Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS and (ix) Weed free. The result showed that the higher growth parameters *viz*., plant height, dry matter accumulation, number of primary and secondary branches $plant^{-1}$; maximum yield attributes and yield *viz.*, length of siliqua (4.30 cm), number of siliqua $plant^{-1}$ (155.00), number of seeds $siliqua^{-1}$ (11.50), test weight (4.50g), seed yield (2250 kg ha^{-1}) and straw yield (4550 kg ha^{-1}) of Indian mustard recorded weed free plot and followed by Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS.

Keywords: Weedn management practices, growth, yield and Indian mustard

Introduction
Oilseed cultivation in India covers about 27 million hectares, much of which lies on marginal and low-fertility soils. Nearly 72% of this area is rainfed, making production highly susceptible to fluctuations in weather conditions. Irregular rainfall patterns and limited irrigation facilities often constrain the yield potential of oilseed crops, especially during critical growth stages. Among these, Indian mustard (*Brassica juncea* L.) holds special importance as a major rabi (winter) oilseed crop, predominantly cultivated across northern India.

Indian mustard (*Brassica juncea* L.), commonly known as *sarson* in Hindi and Urdu, *shorshe* in Bengali, *rai* in Gujarati, *mohari* in Marathi, *aavalu* in Telugu, *kadugu* in Tamil and Malayalam, and *sasive* in Kannada, is a member of the Brassicaceae family and is believed to have originated in China. Globally, the major mustard-producing countries include China, India, Canada, Australia, France, and Germany. In India, mustard is primarily cultivated in the states of Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh, and Gujarat. Among these, Rajasthan ranks first, accounting for about 45.5% of the total area under mustard cultivation, followed by Uttar Pradesh (13.1%), Haryana (11.8%), and Madhya Pradesh (11.1%). During 2023-24, Indian mustard was grown over approximately 6.23 million hectares in the country, producing about 13.2 million tonnes with an average productivity of 1,499 kg ha^{-1}. Rajasthan alone contributed the largest share, with 37.52 lakh hectares under cultivation and a total production of 62.31 lakh metric tonnes, achieving a higher average productivity of 1,661 kg ha^{-1} (DES, 2023) [1].

Indian mustard holds substantial economic and nutritional importance. Its seeds contain about 35-40% oil, 40-57% erucic acid, and 25-30% protein. In addition to being a valuable source of

edible oil, mustard seeds are rich in omega-3 fatty acids, antioxidants, and several essential vitamins and minerals. They are particularly abundant in B-complex vitamins such as folates, niacin, thiamine, riboflavin, and pyridoxine, all of which play crucial roles in metabolic regulation and enzymatic activities. Moreover, mustard seeds are an excellent source of vitamin E, especially gamma-tocopherol, with approximately 19.82 mg per 100 g of seeds. Apart from its extensive use as a cooking medium, mustard oil also holds significance in traditional medicinal applications.

Weeds significantly reduce crop productivity, with yield losses ranging from 10% to 58%, depending on the species, density, and duration of weed-crop competition. In mustard, the absence of effective weed control can lead to yield reductions of up to 68% compared to weed-free conditions (Degra *et al*., 2011) [2]. Moreover, the competition of weeds with crop plant causes severe nutrition deprivation in general (Roshdy *et al*., 2008) [3]. In Indian mustard cultivation, manual weeding performed around 3-4 weeks after sowing is the most common weed management practice. However, the rising cost of labor, its limited availability during peak agricultural operations, and the high expenditure involved in manual weeding necessitate the exploration of alternative weed management strategies. Such alternatives should be both technically effective and economically viable, aiming to suppress weed growth below the economic threshold level and enable the crop to realize its full yield potential (Kalita *et al*., 2017) [4]. Weeds are considered one of the major constraints in crop production, as they compete with crops for essential resources such as nutrients, moisture, light, and space, leading to yield losses ranging from 30% to 70% (Raj *et al*., 2020) [5]. Weed management in mustard is often a costly and labor-intensive task, particularly because it coincides with the sowing period of other *rabi* crops. Additionally, the rising labor costs further add to the challenge. Timely and effective weed control, however, can significantly minimize yield losses in mustard. Among the various factors contributing to low productivity in this crop, inadequate weed management remains one of the most critical constraints. Since mustard is typically cultivated on marginal soils with suboptimal management practices, heavy weed infestation becomes a major cause of reduced yield potential (Mukherjee, 2014) [6]. Several methods are available for effective and efficient weed management in mustard cultivation. Among these, manual weeding is traditionally the most common and reliable practice; however, its feasibility is often limited due to high labor costs and unavailability of workers during critical periods. Moreover, manual weeding is less effective in controlling intra-row weeds. In contrast, the use of herbicides has proven to be an efficient alternative, as it effectively manages both inter-row and intra-row weed populations, thereby reducing crop-weed competition and improving productivity. (Punia *et al*., 2006) [7]. Two-hand weedings, found to be comparable with herbicidal treatments combined with hand weeding, significantly increased the pooled mean seed yield of mustard by 46.3% over the weedy check (Malik *et al*., 2012) [8].

Weed management practices play a crucial role in realizing the maximum yield potential of Indian mustard and therefore require careful planning and implementation. In view of this, the present field experiment was undertaken to evaluate the impact of different weed management strategies on crop performance.

Materials and Methods

The field experiment was conducted during *rabi* seasons of 2024-25 at Agronomy Research Farm, School of Agricultural Sciences, Jaipur National University, Jaipur, Rajasthan. Soil of the experimental field was sandy in texture having pH 7.58, organic carbon (OC) (0.43%), available nutrient (N 217.30; phosphorus (P) 20.28 and potassium (K) 219.20 kg/ha). The experiment was laid out in randomized block design with three replications. The field trial consisted 9 treatments combinations *viz*., (i) Weedy check, (ii) Hand weeding once at 20 DAS, (iii) Pendimethalin at 0.75kg ha^{-1}, (iv) Pendimethalin at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS, (v) Oxadiargyl at 0.75kg ha^{-1} (PE), (vi) Oxadiargyl at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS, (vii) Fluazitfop-p-ethyl at 75ml ha^{-1} (EPOE), (viii) Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS and (ix) Weed free. The Indian Mustard variety 'Giriraj' was sown @ 5 kg seed ha^{-1} with spacing of 30 cm x 10 cm. The two irrigations are applied. All agricultural practices were kept uniform in all the plots.

Results and Discussion

Growth Parameters

The weed management practices significantly enhanced the growth parameters *viz.* plant height (cm), DMA (g/plant) at 40, 60, 80, 100 DAS, at harvest, Number of primary and secondary branches plant^{-1} at 80 and 100 DAS of the Indian mustard (Table 1). The significantly maximum plant height was recorded in weed free plot flowed by Hand weeding twice at 20 & 40 DAS and Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS over other treatments. The increase in growth parametesr observed under various weed management practices could be attributed to reduced competition for essential growth resources such as moisture, nutrients, light, and space. This favorable environment facilitated better vegetative growth, resulting in a higher number of branches per plant compared to the weedy check. These results are in close conformity with those of Sharma *et al*. (2007) [9], Sharna and Jain (2002) [10] and Sharma *et al*. (2005) [11].

Yield attributes and yield

Yield attributes *viz*. length of siliqua, number of siliqua plant^{-1}, number of seeds siliqua^{-1}, test weight and yield *viz*., seed yield and straw yield recorded by weed free, Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS and Pendimethalin at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS were significantly higher as compared to weedy check (Table 2). The findings revealed that the improvement in yield attributes was more pronounced in treatments where weed population and weed dry matter were effectively suppressed during the early stages of crop growth and remained consistently low throughout the growing period. This suggests that reduced weed competition during the initial growth phase had a favorable impact on key yield parameters such as the number of siliquae plant^{-1}, seeds siliqua^{-1}, and other related traits. An increased number of siliquae plant^{-1} serves as an indicator of higher seed yield, primarily due to minimal competition between crop plants and weeds and the creation of a more conducive growth environment. These results are in close conformity with similar findings reported by Nepalia and Jain (200) [12], Yadav (2004) [13] and Singh *et al*. (2012) [14].

Table 1: Effect of weed management practices on growth parameters of Indian mustard

Treatments	Plant height (cm)					Number of primary branches plant^{-1}		Number of secondary branches plant^{-1}		Dry matter accumulation (g plant^{-1})				
	40 DAS	60 DAS	80 DAS	100 DAS	At harvest	80 DAS	100 DAS	80 DAS	100 DAS	40 DAS	60 DAS	80 DAS	100 DAS	At Harvest
Weedy check	32.85	56.79	126.79	173.79	183.79	4.62	6.83	9.72	13.05	6.17	16.47	29.49	33.72	34.22
Hand weeding once at 20 DAS	36.60	60.36	130.36	177.36	187.36	4.91	7.26	10.33	13.87	6.56	17.22	31.34	35.84	36.37
Pendimethalin at 0.75kg ha^{-1}(PE)	42.24	68.48	138.48	185.48	195.48	5.57	8.24	11.72	15.74	7.44	18.66	35.56	40.66	41.26
Pendimethalin at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS	48.62	73.54	143.54	190.54	200.54	5.98	8.84	12.59	16.90	7.99	20.03	38.19	43.67	44.31
Oxadiargyl at 0.75kg ha^{-1} (PE)	40.90	66.75	136.75	183.75	193.75	5.43	8.03	11.43	15.34	7.26	18.19	34.66	39.64	40.22
Oxadiargyl at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS	49.39	75.35	145.35	192.35	202.35	6.13	9.06	12.90	17.32	8.19	20.53	39.13	44.74	45.40
Fluazitfop-p-ethyl at 75ml ha^{-1} (EPOE)	39.82	66.15	136.15	183.15	193.15	5.38	7.95	11.32	15.20	7.19	18.02	34.35	39.28	39.85
Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS	52.34	78.40	148.40	195.40	205.40	6.38	9.43	13.42	18.02	8.52	21.36	40.71	46.55	47.24
Weed free	54.20	80.50	150.50	197.32	207.32	6.55	9.68	13.78	18.50	8.75	21.93	41.80	47.80	48.50
S.Em±	0.72	0.84	0.82	0.87	0.82	0.07	0.10	0.14	0.19	0.09	0.23	0.43	0.50	0.50
CD (*p*=0.05)	2.13	2.48	2.44	2.60	2.43	0.20	0.30	0.42	0.57	0.27	0.68	1.29	1.47	1.49

Table 2: Effect of weed management practices on yield attributes and yield of Indian mustard

Treatments	Yield attributes				Yield	
	Length of siliqua (cm)	No. of siliqua plant^{-1}	No. of seeds siliqua^{-1}	Test weight (g)	Seed yield (kg ha^{-1})	Straw yield (kg ha^{-1})
Weedy check	3.03	119.36	8.11	3.17	987	1997
Hand weeding once at 20 DAS	3.22	128.23	8.62	3.37	1687	3412
Pendimethalin at 0.75kg ha^{-1} (PE)	3.66	135.86	9.78	3.93	1914	3871
Pendimethalin at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS	3.93	141.60	10.51	4.11	2055	4157
Oxadiargyl at 0.75kg ha^{-1} (PE)	3.57	134.53	9.54	3.83	1866	3773
Oxadiargyl at 0.75kg ha^{-1} (PE) + Hand weeding once at 40 DAS	4.03	145.09	10.76	4.21	2106	4259
Fluazitfop-p-ethyl at 75ml ha^{-1} (EPOE)	3.53	133.37	9.45	3.80	1849	3739
Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS	4.19	150.96	11.20	4.38	2191	4431
Weed free	4.30	155.00	11.50	4.50	2250	4550
S.Em±	0.04	1.62	0.12	0.05	23	47
CD (*p*=0.05)	0.13	4.82	0.35	0.14	69	140

Conclusion

Based on one-year field study on Indian mustard, it may be concluded that: amongst the different weed control treatments, weed free was suitable to attain the higher growth parameters, yield attributes and yield of Indian mustard it was followed with the application of Fluazifop-p-ethyl at 75ml ha^{-1} (EPOE) + Hand weeding once at 40 DAS.

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References

1. DES. Directorate of Economics and Statistics, Ministry of Agriculture. 2024. www.agri.com
2. Degra ML, Pareek BL, Shivran RK, Jat RD. Integrated weed management in Indian mustard and its residual effect on succeeding fodder pearl millet. Indian J Weed Sci. 2011;43(1-2):73-76.
3. Roshdy A, El-Din GMS, Mekki BB, Elewa TAA. Weed control on yield and yield components of some canola varieties. Am Eurasian J Agric Environ Sci. 2008;4(1):23-29.
4. Kalita S, Mundra SL, Solanki NS, Sharma NK. Weed management and nitrogen application for improved yield of mustard. Indian J Weed Sci. 2017;49(1):85-87.
5. Raj P, Singh RP, Pal RK, Rajput P, Rana SS. Integrated weed management in Indian mustard (*Brassica juncea* L.). Int J Curr Microbiol Appl Sci. 2020;10:271-276.
6. Mukherjee D. Influence of weed and fertilizer management on yield and nutrient uptake in mustard. Indian J Weed Sci. 2014;46(3):251-255.
7. Punia SS, Shalini P, Ahuja SS. Efficacy of oxadiargyl against weeds in Indian mustard (*Brassica juncea* L.). Haryana J Agron. 2006;22:30-32.
8. Malik RS, Yadav A, Punia SS, Hooda VS, Hasija RC. Efficacy of three dinitroaniline herbicides against weeds in raya. Environ Ecol. 2012;30:787-789.
9. Sharma R, Rana MC, Angiras NN, Chopra P. Efficacy of clodinafop and row spacing in controlling weeds in Gobhi sarson (*Brassica napus* var. oleracea). Indian J Weed Sci. 2007;39(3-4):219-222.
10. Sharma OL, Jain NK. Effect of herbicide on weed dynamics and seed yield of Indian mustard (*Brassica juncea*). Indian J Agric Sci. 2002;72(6):322-324.

11. Sharma SK, Singh V, Panwar KS. Weed management in Indian mustard (*Brassica juncea*) under dryland conditions. Indian J Agric Sci. 2005;75(5):288-289.
12. Nepalia V, Jain GL. Effect of weed control and sulphur on yield of Indian mustard (*Brassica juncea*) and their residual effect on summer greengram (Phaseolus radiatus). Indian J Agron. 2000;45(3):483-488.
13. Yadav RP. Effect of herbicides alone and in combination with cultural methods on weed control in Indian mustard (*Brassica juncea*). Indian J Agron. 2004;49(4):268-270.
14. Singh RS, Singh S, Pandey A, Singh BP. Contribution of production factors on yield and economy of Indian mustard under rainfed condition of north Bihar. Abstracts, NBC-2012:110.