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Effect of Date of Sowing and Weed Management on Weed and Yield of Barley (*Hordeum Vulgare* L.)

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Abstract

A field experiment entitled “Effect of date of sowing and weed management on weed and yield of barley (*Hordeum vulgare* L.)” was conducted on loamy sand soil at Research Farm, School of Agriculture, Suresh Gyan Vihar University, Jaipur during *Rabi* 2025-26 seasons. The treatments in barely during *rabi* seasons comprising 15 combinations having three sowing time 20th Nov, 30th Nov and 10th Dec and five weed management treatments (weedy check, weed free, one hand weeding 30 DAS, Metsulfuron methyl @ 4.0 g/ha at 30 DAS and Carfentrazone ethyl @ 20 g/ha at 30 DAS) were laid out in a split randomized block design with three replications. The maximum seed, straw, biological yield as well as net return and B : C ratio was recorded with 20th November sowing, and followed by 30th November sowing. Maximum seed, straw and biological were recorded with application of one hand weeding @ 30 DAS (92.75, 67.07 and 60.38 % at 30, 60 DAS and harvest) followed by carfentrazone ethyl @ 20 g/ha at 30 DAS (66.60, 45.27 and 42.60 %) and metsulfuron methyl @ 4.0 g/ha at 30 DAS (60.85, 53.92 and 52.60 per cent), respectively. The highest net return and B : C ratio were recorded under the weed-free treatment, which was significantly superior to the weedy check, one hand weeding @ 30 DAS, metsulfuron methyl @ 4.0 g ha⁻¹ at 30 DAS and carfentrazone ethyl @ 20 g ha⁻¹ at 30 DAS.

Keywords: Effective tiller, grain, straw and yield

Introduction

Barley (*Hordeum vulgare* L.) is one of the most important cereals of the world. Barley ranks fourth, next to maize, wheat and rice both in acreage and production. It grows well in temperate and sub-tropical region of earth. Barley (*Hordium Vulgare* L.) is the fourth most important cereal crop grown worldwide on approximately 49.2 million hectares (m ha) with a production of 145.8 million tonnes (Mt) (USDA, 2023) and is considered as one of the most nutritious foods. Barley occupied an area of 0.608 m ha with a production of 1.92 Mt in India during 2024-25 (DA&FW, 2025). Sowing time depends on the weather, topography and harvesting time of preceding crop. Optimum time of sowing plays an important role in enhancing the yield of crop. It is well known that barley varieties respond sharply for yield and other characters to climatic variations according to the time of sowing. Both IWM and herbicide use alone resulted in significantly lower weed density and biomass and higher weed control efficiency and weed control index than weedy check (Das and Das 2018 and Kaur *et al.* 2020) [3, 8]. The herbicides such as metsulfuron-methyl, sulfosulfuron, carfentrazone and isoproturon have shown excellent efficiency in the control of broad and narrow leaf weeds in wheat and barley crop. The study was conducted to identify

efficient weed management options to minimize the weed infestation with minimal nutrient removal by weeds and attain higher barley productivity in Rajasthan (Ram *et al.* 2020) [13].

Method and materials

The experiment was conducted during *rabi* 2025-26 at Agronomy farm, School of Agriculture, Suresh Gyan Vihar University, Jaipur. Geographically, the study area is located at 75°48'84" E longitude and 26°82'47" N latitude and this region falls under agro-climatic zone III A (Semi-arid Eastern Plain Zone) of Rajasthan. The treatments in wheat during *rabi* seasons comprising 15 combinations having four sowing time 20th Nov, 30th Nov and 10th Dec and weed management (weedy check, weed free, one hand weeding @ 30 DAS, Metsulfuron methyl @ 4.0 g/ha at 30 DAS and Carfentrazone ethyl @ 20 g/ha at 30 DAS) treatments was laid out in a split plot design with three replications. Barley was sown at 22.5 cm row spacing using seed rate of 100 kg ha⁻¹.

Results and discussion

Effect of date of sowing

The highest grain, straw and biological yield was recorded with sowing on 20th November, which was significantly

superior to 10th December and remained statistically at par with 30th November. The straw yield increased by 9.20 and 4.04 per cent with sowing on 20th November and 30th November, respectively, over 10th December sowing. The biological yield increased by 9.26 and 4.29 per cent with sowing on 20th November and 30th November, respectively, over 10th December sowing. Late sowing of barley led to significantly reduced yields due to adverse growing conditions, including low temperatures and shortened vegetative periods (Gurjar *et al.* 2024 and Rajbanshi *et al.* 2025) [6, 12]. Its might be due to suitable environmental conditions received by crop plants for their growth and yield contributing characters ultimately yield of crop. Similar results have also been reported by Pathania *et al.* (2018) [10] recorded significantly higher yield of barley. This can also be linked to its better accumulation of dry matter and advantageous traits, such as number of panicles per metre row length, harvest index, panicle weight per metre row length, and improved test weight, all contributing to higher yield (Poudel *et al.* 2020) [11].

Effect of weed management

The highest grain, straw and biological yield was recorded with sowing on 20th November, which was significantly superior to 10th December and remained statistically at par with 30th November. The per cent increased the seed yield by

20th November and 30th November in tune of 9.32 and 4.59 per cent over to 10th December, respectively. The higher yield under timely sowing may be attributed to favourable temperature during vegetative and reproductive phases, longer grain-filling duration and better synchronization of crop growth with available moisture and solar radiation. The present findings are supported by Khan *et al.* (2025) [9] and Himanshu *et al.* (2025) [7].

The highest net return (₹91,006 ha⁻¹) was recorded under the weed-free treatment, which was significantly superior to the weedy check (₹54,979 ha⁻¹), one hand weeding @ 30 DAS (₹83,139 ha⁻¹), metsulfuron methyl @ 4.0 g ha⁻¹ at 30 DAS (₹86,997 ha⁻¹) and carfentrazone ethyl @ 20 g ha⁻¹ at 30 DAS (₹81,458 ha⁻¹). The maximum B:C ratio (2.55) was recorded under the weed-free treatment, which was significantly superior to the weedy check (1.68), one hand weeding @ 30 DAS (2.34), metsulfuron methyl @ 4.0 g ha⁻¹ at 30 DAS (2.46) and carfentrazone ethyl @ 20 g ha⁻¹ at 30 DAS (2.26). The higher profitability under weed-free conditions was mainly due to greater grain and straw yields resulting from effective suppression of weed competition. Among herbicides, metsulfuron methyl recorded comparatively higher net returns and B:C ratio because of its effective weed control and relatively low application cost (Bhakar *et al.* 2026) and Babu and Mishra (2026) [1, 2].

Table 1: Effect of date of sowing and weed management on yields (kg/ha)

Treatments	Grain yield	Straw yield	Biological yield
Sowing dates			
20 th November	4337	5221	9559
30 th November	4150	4974	9124
10 th December	3968	4781	8749
SEm±	78	72	142
CD =0.05%	210	210	422
Weed Management			
Weedy check	3268	3818	7087
Weed free	4566	5541	10107
One hand weeding @ 30 DAS	4282	5165	9447
Metsulfuron methyl @ 4.0 g/ha at 30 DAS	4423	5342	9766
Carfentrazone ethyl @ 20 g/ha at 30 DAS	4219	5095	9313
SEm±	98	49	127
CD =0.05%	291	143	359

Table 2: Effect of date of sowing and weed management on economics (Rs/ha)

Treatments	Gross return	Net return	B : C ratio
Sowing dates			
20 th November	117209	84569	2.40
30 th November	112010	79370	2.26
10 th December	107248	74608	2.12
SEm±	1849	1565	0.04
CD =0.05%	7260	6144	0.17
Weed Management			
Weedy check	87619	54979	1.68
Weed free	123646	91006	2.55
One hand weeding @ 30 DAS	115779	83139	2.34
Metsulfuron methyl @ 4.0 g/ha at 30 DAS	119637	86997	2.46
Carfentrazone ethyl @ 20 g/ha at 30 DAS	114098	81458	2.26
SEm±	1872	1872	0.03
CD =0.05%	5463	5463	0.10

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