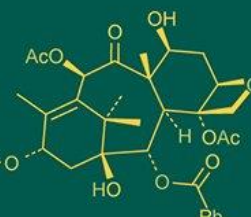
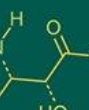
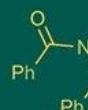


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Effect of date of sowing and nutrient management on mustard (*Brassica juncea* L.)

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Abstract

A field experiment entitled “Effect of Date of Sowing and Nutrient Management on Mustard (*Brassica juncea* L.)” conducted during Rabi 2025-26 at Agriculture farm, Suresh Gyan Vihar University, Jaipur on sandy loam soil. The treatments in wheat during rabi seasons comprising fifteen treatment combinations having main factor (20th October, 30th October and 10th November) and sub plot (control, 100% RDF, 75% RDF + one nano urea spray at 30 DAS, 50% RDF + Two nano urea sprays at 30 and 60 DAS and 75% RDF + Two nano urea sprays at 30 and 60 DAS). The sowing on 30th October significantly increased seed, stover and biological yield compared to 20th October sowing and remained statistically at par with 10th November, respectively. The maximum net return of ₹74,710 ha⁻¹ was recorded with 30th October sowing, followed by 10th November sowing (₹70,129 ha⁻¹), whereas the minimum net return (₹54,572 ha⁻¹) was recorded with 20th October sowing. The maximum seed, stover and biological yield were recorded with application of 75% RDF + two nano urea sprays at 30 and 60 DAS, followed by 75% RDF + one nano urea spray at 30 DAS, 50% RDF + two nano urea sprays at 30 and 60 DAS and 100% RDF. The maximum net return (₹75,393 ha⁻¹) was recorded with the application of 75% RDF + two nano urea sprays at 30 and 60 DAS, followed by 50% RDF + two nano urea sprays (₹70,898 ha⁻¹), 75% RDF + one nano urea spray at 30 DAS (₹69,214 ha⁻¹) and 100% RDF (₹63,803 ha⁻¹).

Keywords: Mustard, sowing date, nutrient management, nano urea, yield, economics

Introduction

Indian mustard (*Brassica juncea* L.) is an important oil-yielding crop that belongs to the family Brassicaceae, having chromosome number $2n = 36$, and is a natural amphidiploid derived from an interspecific cross between *B. nigra* and *B. campestris*. Different regions have different names for it, including Sarson, Rai, Raya, Toria, and Lahi. Rai or Laha is frequently called mustard, and Sarson and Toria are commonly called rapeseed. The occupied area, production, and yield of mustard in India were 10.47 million hectares, 13.2 million tons, and 1443 kg/ha, respectively, during 2023-24. DA&FW (Agricultural-Statistics-at-a-Glance-2023

Among the different agro nomic practices, optimum sowing time is very important for mustard production. Delayed sowing of mustard crop can face unfavorable weather conditions at flowering and siliquae formation which shorten maturity period, decreased number of siliquae/plant as well as infestation of aphids that finally lead to reduction in seed yield. Uniform distribution of plants over an area results in efficient use of nutrients, moisture, sun light and suppression of weeds leading to high yield (Patel and Patel 2022) [8]. The concept behind integrated nutrient management is Maintaining the fertility of the soil and providing vital plant nutrients at the ideal level for the sustained growth of the targeted crop and crop yield. Sridhara *et al.* (2022) [10] found that foliar application of nitrogen enhances the economic yield of chickpea. It is used in place of conventional urea and other nitrogenous fertilizers for better environment, soil health and farmers profitability. Nano urea contains 4% nitrogen by weight in its nano form (Kantwa and Yadav, 2022) [4]. Nano urea is a potential component of 4 R nutrient stewardship as it promotes precision and sustainable agriculture. It promotes clean and green technology as its industrial production is neither energy intensive or resource consuming. Nano urea reduces the requirement of conventional urea by 50% or more (Baboo, 2021) [1].

Methods and Materials

A field experiment entitled “Effect of Date of Sowing and Nutrient Management on Mustard (*Brassica juncea* L.)” conducted during *Rabi* 2025-26 at Agriculture farm, Suresh Gyan Vihar University, Jaipur on sandy loam soil. 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 fifteen treatment combinations having main factor (20th October, 30th October and 10th November) and sub plot (control, 100% RDF, 75% RDF + one nano urea spray at 30 DAS, 50% RDF + Two nano urea sprays at 30 and 60 DAS and 75% RDF + Two nano urea sprays at 30 and 60 DAS) treatments was laid out in a Spilt plot design with three replications. Mustard was sown at 45 cm row spacing using seed rate of 05 kg ha⁻¹.

Results and Discussion

Date of sowing

The data presented in the table indicate that seed, stover and biological yield of mustard were significantly influenced by date of sowing. Among the different dates, 30th October sowing recorded the maximum seed yield (1477 kg ha⁻¹), stover yield (4490 kg ha⁻¹) and biological yield (5967 kg ha⁻¹), followed by 10th November sowing, while the minimum values were recorded with 20th October sowing. The higher yield under 30th October sowing may be attributed to better synchronization of crop growth and reproductive stages with favourable temperature and radiation conditions, resulting in greater dry-matter accumulation and improved yield attributes such as siliquae plant⁻¹ and seeds siliqua⁻¹. Recent studies have confirmed that optimum sowing time enhances growth, yield attributes and biomass production in mustard. The present results are also supported by Keerthi *et al.* (2025) [5] and Meena *et al.* (2026) [7]. The maximum net return (₹74,710 ha⁻¹) and B:C ratio (1.96) were recorded with 30th October sowing, followed by 10th November sowing (₹70,129 ha⁻¹ and 1.84), whereas the minimum net return (₹54,572 ha⁻¹) and B:C ratio (1.43) were obtained

with 20th October sowing. Thus, 30th October sowing resulted in 36.90 and 6.53% higher net return and 36.79 and 6.50% higher B:C ratio than 20th October and 10th November sowing, respectively. The higher profitability under 30th October sowing was mainly due to its superior seed and stover yields, which increased gross returns without a proportionate increase in cultivation cost. The present findings are supported by Singh and Singh (2020) [9] and Chaudhary *et al.* (2026) [12].

Effect of nitrogen management

The maximum seed yield (1483 kg ha⁻¹), stover yield (4564 kg ha⁻¹) and biological yield (6047 kg ha⁻¹) were recorded with 75% RDF + two nano-urea sprays at 30 and 60 DAS, followed by 50% RDF + two nano-urea sprays, 75% RDF + one nano-urea spray and 100% RDF, while the minimum values were recorded under control. The higher productivity under 75% RDF + two nano-urea sprays may be attributed to better synchronization of nitrogen supply with crop demand, particularly during active vegetative and reproductive stages. The resulting increase in branches, siliquae plant⁻¹ and seeds siliqua⁻¹ ultimately contributed to greater seed yield, while enhanced vegetative growth increased stover and total biological yield. The findings are supported by Kumar *et al.* (2025) [6] and Thakur *et al.* (2026) [11].

The maximum net return (₹75,393 ha⁻¹) and B:C ratio (1.93) were obtained with 75% RDF + two nano-urea sprays at 30 and 60 DAS, followed by 50% RDF + two nano-urea sprays and 75% RDF + one nano-urea spray. Similarly, the B:C ratio was 29.59% higher than control and 24.25, 20.82 and 10.85% higher than 100% RDF, 75% RDF + one spray and 50% RDF + two sprays, respectively. The higher profitability was primarily due to greater seed and stover yields obtained with the integrated treatment, while the partial replacement of conventional N with nano-urea helped maintain input costs. The present findings are supported by Tripathi *et al.* (2025) [12] and Thakur *et al.* (2026) [11].

Table 1: Effect of date of sowing and nutrient management on yield (kg/ha)

Treatments	Yield (kg/ha)			
	Seed	Stover	Biological	HI (%)
Date of sowing				
20 th October	1207	3684	4890	24.67
30 th October	1477	4490	5967	24.78
10 th November	1414	4329	5743	24.67
SEm±	28	97	125	0.06
CD 0.05%	111	382	492	NS
Nutrient management				
Control	1188	3601	4789	24.80
100% RDF	1332	4036	5369	24.82
75% RDF + one nano urea spray at 30 DAS	1402	4282	5684	24.67
50% RDF + Two nano urea sprays at 30 and 60 DAS	1425	4354	5779	24.69
75% RDF + Two nano urea sprays at 30 and 60 DAS	1483	4564	6047	24.56
SEm±	30	89	118	0.14
CD 0.05%	88	260	343	NS
CV (%)	7	6	6	3.56

Table 2: Effect of date of sowing and nutrient management on economics

Treatments	Gross return (₹/ha)	Net return (₹/ha)	B : C ratio
Date of sowing			
20 th October	90212	54572	1.43
30 th October	110350	74710	1.96
10 th November	105769	70129	1.84
SEm±	2166	2166	0.06
CD 0.05%	8504	8504	0.22
Nutrient management			
Control	88683	53043	1.49
100% RDF	99443	63803	1.65
75% RDF + one nano urea spray at 30 DAS	104854	69214	1.80
50% RDF + Two nano urea sprays at 30 and 60 DAS	106538	70898	1.85
75% RDF + Two nano urea sprays at 30 and 60 DAS	111033	75393	1.93
SEm±	2212	2212	0.06
CD 0.05%	6456	6456	0.17
CV (%)	6	10	9.95

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