Online ISSN 2456-6489

Research Article

Indian Journal of Agroforestry
Vol. 28, No. 2, April–June 2026

Evaluation of Linseed Varietal Response to Different Sowing Dates Under Mango Based Agri-horticulture System

Alankrita Shah[1], Arti Singhad[1], S Sarvade[1*], Rakesh Bajpai[1], S B Agrawal[1], A K Khare[1] and A K Handa[2]

[1]*Department of Forestry, College of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur - 482 004 (MP)*
[2]*ICAR-Central Agroforestry Research Institute, Jhansi - 284003 (UP)*

* Corresponding author. E-mail: somanath553@gmail.com

https://doi.org/10.48165/ija.2026.28.02.08

ARTICLE INFO
Received: 29.03.2026
Accepted: 18.06.2026

Keywords:
Agri-horticulture
Linseed
Sowing dates
Mango
Growth and yield
Economics

ABSTRACT

Linseed, one of the oldest oilseed crops cultivated in India, plays an important role in Rabi agriculture. A field experiment was conducted to evaluate the influence of different sowing dates and varieties on growth, yield attributes, yield, and economics of linseed under a mango-based agri-horticulture system. The study was laid out in a factorial randomized block design with three sowing dates, D_1 (20 October), D_2 (5 November), and D_3 (20 November) and four varieties (V1: JLS66, V2: JLS9, V3: JLS27, V4: JLS73), replicated thrice. The results indicated that both sowing time and varietal differences significantly affected all parameters at the 5% level. Among the sowing dates, 20 October proved superior, recording higher growth, seed yield (1158.50 kg ha^{-1}), straw yield (3796.24 kg ha^{-1}), biological yield (4969.04 kg ha^{-1}), and harvest index (23.2%), along with better economic returns. This was followed by 5 November sowing, while delayed sowing on 20 November led to reduced performance due to unfavorable environmental conditions. Among the varieties JLS66 showed the best performance, with the highest seed yield (1298.44 kg ha^{-1}), straw yield (3934.74 kg ha^{-1}), biological yield (5280.99 kg ha^{-1}), and harvest index (24.6%), along with maximum economic returns. JLS9 performed the poorest, whereas JLS27 and JLS73 showed intermediate results. Timely sowing on 20 October combined with a suitable variety (JLS66) significantly enhances productivity and profitability of linseed under agri-horticultural system.

INTRODUCTION

Linseed (*Linum usitatissimum* L.) is an important rabi oilseed crop belonging to the family linaceae and is valued for its high oil content (35-45%) and rich concentration of α-linolenic acid (omega-3 fatty acid), which contributes significantly to its nutritional and industrial importance (Sulas *et al.,* 2019). Besides edible oil, linseed provides protein-rich meal and fiber, making it a multifunctional crop suitable for diversified farming systems (Singh *et al.,* 2018; FAOSTAT, 2023). Owing to its short duration and moderate nutrient requirement, linseed is increasingly integrated into fruit-based agri-horticultural and agroforestry systems. Among the production factors, varietal selection and sowing time play crucial roles in determining crop productivity. Linseed varieties exhibit considerable variation in growth duration, branching pattern, capsule formation, seed size, and tolerance to abiotic stresses. Genotype × environment interactions often result in significant differences in yield performance, necessitating the identification of stable and adaptable varieties for specific agro-climatic conditions (Kumhare *et al.,* 2022).

Sowing date is another major agronomic factor influencing the phenological development, biomass accumulation, and yield of linseed. Timely sowing ensures adequate vegetative growth and allows flowering and seed filling to coincide with favorable temperature and moisture conditions (Gangwar *et al.,* 2012). In contrast, delayed sowing shortens crop duration, reduces branching and capsule formation, and exposes the crop to terminal heat stress during reproductive stages, leading to considerable yield losses (Raghuvanshi *et al.,* 2023; Gupta *et al.,* 2025). Studies have reported yield reductions ranging from 10 to 30% under late sowing compared to optimum planting dates. Therefore, optimizing sowing windows according to varietal characteristics is essential for maximizing productivity and improving resource use efficiency, particularly under variable environmental conditions.

In mango (*Mangifera indica* L.) based agri-horticulture systems, intercrops are subjected to altered microclimatic conditions due to tree canopy effects, including partial shading, modified light intensity, moderated temperature, and competition for soil moisture and nutrients. These changes can significantly affect crop growth, photosynthetic efficiency, and assimilate partitioning (Sarvade *et al.,* 2014a). Varietal differences in shade tolerance and growth habit may influence linseed adaptability under orchard environments, while optimum sowing dates can help synchronize critical growth stages with favorable environmental conditions. Previous studies have shown that appropriate crop management practices, particularly suitable variety selection and optimum sowing time, can minimize yield reductions and enhance overall productivity in tree-based systems (Nair, 2011; Sarvade *et al.,* 2014b; Sahu *et al.,* 2022). However, information on the combined effects of linseed varieties and staggered sowing dates under mango-based agri-horticulture systems remains limited. Therefore, systematic evaluation of genotype and sowing time interactions is essential to identify suitable combinations for improving yield attributes, seed productivity, and resource use efficiency under agri-horticultural systems.

Therefore, the present study aims to evaluate the growth performance, yield attributes, and productivity of selected linseed varieties sown at different dates under mango-based agri-horticulture systems, with the objective of identifying suitable variety and sowing date combinations for sustainable integrated farming.

MATERIALS AND METHODS

The present study was conducted during 2021-22 at All India Coordinated Research Project Research Farm, JNKVV, Jabalpur. The experimental site is geographically located in the Jabalpur district of Madhya Pradesh and falls under the Kymore Plateau and Satpura Hills Agro-Climatic Zone (Zone VII). The geographical coordinates of the site are 23°12′50″ N latitude and 79°57′56″ E longitude, with an altitude of approximately 411.78 m above mean sea level. The climate of the district is humid subtropical climate and well suited for the cultivation of various crops, as it receives an average annual rainfall of about 1358 mm. An experiment was laid out in a 4-year-old mango (*Mangifera indica* L) based agri-horticulture system with spacing of 5 m × 5 m, to evaluate performance of four linseed varieties V_1: JLS66, V_2: JLS9, V_3: JLS27, V_4: JLS73 and sown on three different date of sowing D_1: 20 October, $D_{2:}$ 5 November, D_3: 20 November. An experiment comprised a total of 12 treatment combinations, which were laid out in a factorial randomized block design (RBD) with 3 replications. The crop was established with a seed rate of 30 kg ha^{-1}, maintaining a row spacing of 30 cm, while seeds were placed continuously within each row to ensure uniform stand establishment. A recommended fertilizer dose of 60:30:20 kg N: P_2O_5: K_2O per hectare was applied to meet the nutritional requirements of the crop (Chopra and Badiyala, 2015).

Observations on important morphological attributes such as plant population, plant height, number of branches per plant, days to flowering initiation, and days to 50% flowering were recorded at appropriate growth stages using standard agronomic procedures. Measurements were taken from randomly selected representative plants in each plot to ensure reliability and minimize experimental error. Yield-contributing characters and final seed yield were determined at physiological maturity and after harvest to obtain precise estimates of crop performance under different treatments.

The data collected on various morphological and quantitative traits were statistically analyzed using appropriate procedures for a factorial randomized block design. Analysis of variance (ANOVA) was performed to test the significance of treatment effects, and the comparison of treatment means was carried out at the 5% level of significance to assess differences among sowing dates, varieties, and their interactions. The results obtained from the analysis were systematically presented in tabular form for clarity and precision, and further supported with suitable graphical representations in the results section to facilitate better interpretation of trends and treatment responses. The statistical approach adopted in this study is in line with standard methodologies described by Gomez and Gomez (1984), along with contemporary analytical practices widely used in agricultural research.

RESULTS AND DISCUSSION

Growth parameters

Sowing dates and varietal differences exerted a significant influence on growth and phenological behavior of the crop (Table 1). Among the sowing windows, early sowing on 20th October (D_1) consistently recorded superior performance in terms of plant population (55.9), plant height (71.5 cm), number of branches per plant (10.8), flower initiation (63.4 days), and days to 50% flowering (65.6 days), followed by D_2 (5^{th} November), whereas delayed sowing (D_3: 20^{th} November) resulted in comparatively reduced values for all parameters. The enhanced performance under D_1 can be strongly linked to the synchronization of crop growth with congenial temperature regimes and optimal photoperiod during early developmental stages, which promotes efficient germination, robust vegetative growth, and higher assimilate accumulation. Moreover, timely sowing ensures an extended growth duration, facilitating improved canopy development, greater light interception, and enhanced photosynthetic efficiency. In contrast, delayed sowing exposes the crop to suboptimal thermal conditions and terminal stress, leading to curtailed growth period, impaired physiological activity, and reduced biomass accumulation.

Varietal response also exhibited marked variation, reflecting inherent genetic potential. Variety V_3 (JLS-27) registered maximum plant population (56.4) and plant height (74.3 cm), indicating its superior establishment and vigor, whereas V_1 (JLS-66) produced the highest number of branches per plant (12.3), which is a critical determinant of yield potential. In terms of phenology, V_4 (JLS-73) required the longest duration for flower initiation (63.7 days) and 50% flowering (65.7 days), signifying its relatively late maturity, while V_1 and V_2 exhibited early flowering behavior, which may be advantageous under certain agro-climatic constraints. These variations are primarily governed by genetic makeup and differential adaptability of varieties to prevailing environmental

DOI: https://doi.org/10.48165/ija.2026.28.02.08

Table 1: Effect of date of sowing and linseed varieties growth performance

Particulars	Plant population	Plant height	Number of branches/plant	Flower initiation	Days taken to 50% flowering
20 October	55.7	71.5	10.8	63.4	65.6
5 November	54.4	69.7	10.1	62.3	64.7
20 November	50.2	65.3	8.4	58.0	58.3
Mean	53.4	68.8	9.8	61.2	62.9
SEm±	0.5	0.3	0.4	0.7	0.7
CD (*P*=0.05)	1.3	0.9	1.1	2.1	1.9
JLS66	53.2	69.8	12.3	60.3	62.7
JLS9	55.1	67.7	8.5	60.1	62.6
JLS27	56.4	74.3	9.6	62.3	64.6
JLS73	52.9	67.0	10.0	63.7	65.7
Mean	54.4	69.7	10.1	61.6	63.9
SEm±	0.5	0.4	0.4	0.8	0.8
CD (*P*=0.05)	1.5	1.0	1.3	2.4	2.2

Table 2: Effect of date of sowing and linseed varieties on yield attributes

Particulars	Capsules plant^{-1}	Seeds capsule^{-1}	Capsule weight (g)	Test weight (g)
20 October	67.8	6.7	1.2	5.0
5 November	64.9	6.2	0.9	4.8
20 November	60.1	4.4	0.7	4.2
Mean	64.3	5.8	0.9	4.7
SEm±	0.9	0.1	0.0	0.1
CD (*P*=0.05)	2.6	0.4	0.1	0.2
JLS66	69.6	7.3	1.5	4.9
JLS9	60.3	5.3	0.5	4.7
JLS27	63.8	6.3	0.7	4.4
JLS73	67.0	6.1	0.5	4.9
Mean	65.2	6.3	0.8	4.7
SEm±	1.0	0.2	0.4	0.1
CD (*P*=0.05)	3.0	0.4	0.2	0.2

conditions. The findings are in strong agreement with earlier reports of Ganvit *et al.* (2019), Bhalavi *et al.* (2023), and Singh *et al.* (2014), emphasizing that optimal sowing time coupled with suitable varietal selection is a key determinant of improved growth and crop performance.

Yield attributes

Yield attributes were significantly influenced by both sowing dates and varietal differences (Table 2), underscoring the combined role of environmental conditions and genetic potential in determining reproductive efficiency. Among the sowing dates, early sowing recorded the highest number of capsules per plant (67.8), seeds per capsule (6.7), capsule weight (1.2 g), and test weight (4.97 g), whereas delayed sowing resulted in the lowest values across all yield attributes. The superiority of early sowing can be attributed to the alignment of critical reproductive stages with favorable temperature and photoperiod, which enhanced floral initiation, pollination efficiency, and seed setting. Additionally, timely sowing ensured efficient partitioning of assimilates towards reproductive sinks, leading to improved capsule development and seed filling. In contrast, late sowing likely subjected the crop to thermal and moisture stress during flowering and grain filling, thereby limiting assimilate availability and reducing sink strength.

Varietal performance exhibited distinct differences, reflecting inherent genetic variability. Variety JLS-66 emerged as the most productive, recording significantly higher capsules per plant (69.6), seeds per capsule (7.3), and capsule weight (1.5 g), indicating a strong source-sink relationship and superior resource use efficiency. Interestingly, the highest test weight was observed in JLS-73 (4.94 g), suggesting its enhanced seed filling capacity, possibly due to efficient assimilate translocation during later growth stages. On the other hand, JLS-9 consistently recorded the lowest values for most yield attributes, highlighting its relatively poor adaptability and genetic limitations under the prevailing conditions, while JLS-27 showed intermediate performance.

These findings strongly corroborate earlier reports by Mohapatra *et al.* (2009), Al-Doori (2012), Bhalavi *et al.* (2023), Singh and Singh (2011), Singh *et al.* (2015), and Kumhare *et al.* (2022), emphasizing that optimum sowing time coupled with genetically efficient varieties plays a decisive role in enhancing reproductive traits and ultimately improving yield potential.

Yield

A pronounced and statistically significant variation in yield parameters under different sowing dates and varietal treatments, clearly demonstrated their critical role in determining overall crop productivity (Table 3). Among the sowing dates, 20th October recorded the highest seed yield (1158.5 kg ha^{-1}), straw yield (3796.4 kg ha^{-1}), and biological yield (4969.0 kg ha^{-1}), followed by 5th November sowing, whereas 20th November consistently registered the lowest values for all yield parameters. The harvest index was also maximum under early sowing (23.2%), indicating more efficient partitioning of assimilates towards economic yield. The superior performance of early sowing can be attributed

Table 3: Effect of date of sowing and linseed varieties on yield

Particulars	Seed yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index (%)
20 October	1158.5	3796.2	4969.0	23.2
5 November	1092.3	3657.7	4750.0	22.9
20 October	1011.0	3426.0	4562.0	21.1
Mean	1087.3	3626.6	4760.3	22.4
SEm±	12.7	53.9	70.1	0.2
CD (P=0.05)	37.2	158.1	205.6	0.6
JLS66	1298.4	3934.7	5281.0	24.6
JLS9	868.2	3420.0	4288.3	20.2
JLS27	1079.7	3715.4	4795.0	22.5
JLS73	1139.4	3639.4	4778.9	23.9
Mean	1096.4	3677.4	4785.8	22.8
SEm±	14.6	62.2	80.9	0.2
CD (P=0.05)	43.0	182.5	237.4	0.7

to optimal environmental conditions, particularly favorable temperature regimes and extended growth duration, which enhanced biomass accumulation and assimilate translocation. In contrast, delayed sowing exposed the crop to terminal heat stress and shortened growth period, leading to reduced photosynthetic efficiency, forced maturity, and ultimately lower yields. Similar trends have been documented by Tiwari *et al.* (2018) and Rathore *et al.* (2020), who emphasized the detrimental effects of late sowing on linseed productivity.

Varietal differences also exhibited a strong influence on yield performance. Variety JLS-66 emerged as the most productive, recording the highest seed yield (1298.4 kg ha^{-1}), straw yield (3934.7 kg ha^{-1}), biological yield (5281.0 kg ha^{-1}), and harvest index (24.6%), thereby reflecting its superior genetic potential and efficient resource utilization. This may be attributed to its better growth vigour, enhanced sink capacity, and improved assimilate partitioning. Variety JLS-27 performed moderately well, while JLS73 showed intermediate response. In contrast, JLS-9 recorded the lowest yield (868.2 kg ha^{-1}) along with reduced straw and biological yields, indicating its comparatively poor adaptability under the prevailing agro-climatic conditions. These findings corroborate earlier reports by Verma *et al.* (2019), Yadav *et al.* (2021), and Patel *et al.* (2022), which also highlighted the importance of varietal selection in maximizing linseed yield. Overall, the results strongly emphasize that timely sowing coupled with high-performing varieties like V_1 is essential for achieving higher productivity and efficient resource use under such agro-ecological conditions.

Economics

Sowing time and varietal selection significantly influenced the profitability of linseed cultivation. Among the sowing dates, 20th October recorded the highest gross monetary return (₹ 70,154 ha^{-1}), net monetary return (₹ 48,154ha^{-1}), and benefit-cost (B:C) ratio (2.19), and was found to be significantly superior to other two dates of sowing. 5 November sowing exhibited moderate economic returns (₹ 66,300 and ₹ 44,300 ha^{-1} with B:C ratio of 2.01), whereas 20th November recorded the lowest returns (₹ 63,122 and ₹ 40,215 ha^{-1} with B:C ratio of 1.67), indicating reduced economic efficiency under delayed sowing. The economic advantage of 20 October sowing could be strongly linked to its higher productivity, which enhanced gross income and ensured better recovery of input costs. Moreover, timely sowing improved resource-use efficiency by synchronizing crop growth with favorable climatic conditions, thereby maximizing returns per unit investment. The gradual decline in profitability from 20 October to 20 November sowing reflected the adverse impact of delayed sowing on yield formation and input utilization efficiency, a trend also highlighted by Kumar *et al.* (2020) and Choudhary *et al.* (2021).

Among the varieties, JLS-66 emerged as the most economically viable, recording the highest gross return (₹ 77,985 ha^{-1}), net return (₹ 55,985ha^{-1}), and B:C ratio (2.54), significantly outperforming all other varieties. This superior performance is primarily attributed to its higher yield potential, better adaptability, and efficient conversion of inputs into economic output. Variety JLS-73 ranked next, followed by JLS-27, while JLS-9 recorded the lowest economic returns (₹ 53,725 and ₹ 31,725 ha^{-1} with B:C ratio of 1.44), indicating its poor profitability under the given conditions. The lower returns in JLS9may be associated with its inferior yield performance and limited resource-use efficiency. These findings are in close agreement with the reports of Singh *et al.* (2020), Meena *et al.* (2022), and Patel *et al.* (2023), who also emphasized that the selection of high-yielding and well-adapted varieties, along with optimum sowing time, is crucial for maximizing economic returns in linseed cultivation.

CONCLUSION

The findings of the present study clearly indicated that variations in thermal environment and varietal traits exerted a strong influence on the growth behavior, yield formation, and productivity of linseed. Among the different sowing schedules, the crop established on 20th October performed the best, suggesting that optimum sowing time allowed the crop to effectively utilize favorable temperature conditions throughout its growth period. With respect to varietal performance, JLS-66 proved to be the most efficient and high-performing genotype, recording superior growth parameters, better yield attributes, and enhanced economic returns over the other varieties. This advantage could be attributed to its higher adaptability and more efficient conversion of

Table 4: Effect of date of sowing and varieties on economics

Particulars	Gross monetary return (Rs. ha^{-1})	Net monetary return (Rs. ha^{-1})	B:C ratio
20 October	70154	48154	2.19
5 November	66299	44299	2.01
20 October	63122	40215	1.67
Mean	66525	44223	1.96
SEm±	764.3	754.3	0.03
CD (*P*=0.05)	2241.6	2141.6	0.10
JLS66	77985	55985	2.54
JLS9	53725	31725	1.44
JLS27	65733	43733	1.99
JLS73	68809	46809	2.13
Mean	66563	44563	2.03
SEm±	882.5	872.5	0.04
CD (*P*=0.05)	2588.3	2568.3	0.12

available resources into economic yield under the given agroclimatic conditions.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the support of the All India Coordinated Research Project on Agroforestry (AICRP on AF), Jabalpur Centre, for providing financial assistance, research infrastructure, and valuable technical guidance. Sincere thanks are also extended to ICAR–Central Agroforestry Research Institute, Jhansi, for its continuous institutional support. The cooperation and dedicated efforts of the scientific, technical, and field staff during experimentation and data collection are highly appreciated.

REFERENCES

Al-Doori, S. A. M. (2012). Influence of sowing dates on growth, yield and quality of some flax genotypes (*Linum usitatissimum* L.). *College of Basic Education Researchers Journal, 12*(1), 733–746.

Bhalavi, R., Singh, T., Tiwari, A. S., & Kumar, P. (2023). Effect of sulphur level and date of sowing on growth, yield and quality of linseed (*Linum usitatissimum* L.). *The Pharma Innovation Journal, 12*(1), 2204–2210.

Chopra, P., & Badiyala, D. (2015). Performance of linseed (*Linum usitatissimum* L.) varieties to varying seed rates under utera system of cultivation in North West Himalayas. *Journal of Oilseeds Research, 32*(1). https://doi.org/10.56739/jor.v32i1.142022

Choudhary, R., Sharma, A., & Meena, M. L. (2021). Effect of sowing dates and varieties on yield and economics of linseed (*Linum usitatissimum* L.). *Journal of Oilseed Research, 38*(2), 145–149.

FAOSTAT. (2023). *Food and Agriculture Organization statistical database.* Food and Agriculture Organization of the United Nations.

Gangwar, A., Jadhav, T. A., & Sarvade, S. (2012). Performance of spring planted urdbean varieties as influenced by dates of planting. *Environment & Ecology, 30*(4A), 1563–1566.

Ganvit, J. B., Sharma, S., Surve, V. H., & Ganvit, V. C. (2019). Effect of sowing dates and crop spacing on growth, yield and quality of linseed under south Gujarat condition. *Journal of Pharmacognosy and Phytochemistry, 8*(1), 388–392.

Gupta, S. K., Sidar, R. S., Rathiya, P. S., Patel, D. K., & Netam, T. C. (2025). Performance of linseed (*Linum usitatissimum* L.) varieties to different sowing dates. *International Journal of Research in Agronomy, 8*(9), 937–941.

Jiotode, D. J., Damodar, P., Shanti, P., & Khawle, V. S. (2017). Effect of different dates of sowing and crop weather on linseed varieties. *Journal of Soils and Crops, 27*(1), 232–238.

Kumar, S., Singh, R., & Yadav, P. (2020). Influence of sowing time on growth, yield, and profitability of linseed under different agro-climatic conditions. *Indian Journal of Agronomy, 65*(3), 321–326.

Kumhare, A., Kumar, K., Jiotode, D. J., & Thakur, S. (2022). Effect of sowing dates on yield attributes, yield and economics of linseed (*Linum usitatissimum* L.) varieties. *Journal of Experimental Agriculture International, 44*(1), 37–46.

Maurya, A. C., Raghuveer, M., Goswami, G., & Kumar, S. (2017). Influences of date of sowing on yield attributes and yield of linseed (*Linum usitatissimum* L.) varieties under dryland condition in Eastern Uttar Pradesh. *International Journal of Current Microbiology and Applied Sciences, 6*(7), 481–487.

Meena, B. S., Kumawat, N., & Meena, R. S. (2022). Productivity and economic evaluation of linseed varieties under varying management practices. *Legume Research, 45*(4), 512–517.

Mohapatra, S. C., Bishoyi, B. S., & Patra, H. K. (2009). Effect of sowing dates and varieties on production of linseed (*Linum usitatissimum* L.). *Environment and Ecology, 27*(1A), 436–438.

Nair, P. K. R. (2011). Agroforestry systems and environmental quality: Introduction. *Journal of Environmental Quality, 40*(3), 784–790.

Patel, A. B., Verma, H. P., & Singh, V. (2023). Performance of linseed varieties under different sowing environments: Yield and economic analysis. *International Journal of Plant & Soil Science, 35*(6), 78–85.

Patel, N. R., Singh, V., & Sharma, A. (2022). Varietal performance of linseed (*Linum usitatissimum* L.) for yield and economics under rainfed conditions. *The Pharma Innovation Journal, 11*(3), 1567–1571.

Raghuvanshi, R., Singh, R. P., Verma, M. K., & Tiwari, A. K. (2023). Effect of different sowing dates on yield and attributing characters of linseed. *International Journal of Statistical Applications in Mathematics, 8*(6S), 522–524.

Rathore, S. S., Tomar, S. S., & Singh, R. (2020). Influence of sowing time on productivity and profitability of linseed (*Linum usitatissimum* L.) in central India. *International Journal of Agricultural Sciences, 12*(1), 102–106.

Sahu, S., Sah, R. B., Kumar, A., & Dhanyashri, P. V. (2022). Growth and yield of crops and soil quality improvement in mango based agri-horticulture system. *Indian Journal of Agroforestry, 24*(1), 45–52.

Sarvade, S., Mishra, H. S., Kaushal, R., Chaturvedi, S., Tewari, S., & Jadhav, T. A. (2014a). Performance of wheat (*Triticum aestivum* L.) crop under different spacings of trees and fertility levels. *African Journal of Agricultural Research, 9*(9), 866–873.

Sarvade, S., Mishra, H. S., Kaushal, R., Chaturvedi, S., & Tewari, S. (2014b). Wheat (*Triticum aestivum* L.) yield and soil properties as influenced by different agri-silviculture systems of Terai region, northern India. *International Journal of Bio-Resource & Stress Management, 5*(3), 350–355.

Singh, A. K., Singh, R. R., Singh, A. K., & Singh, P. K. (2014). Influence of dates of sowing and irrigation scheduling on growth and yield of mustard (*Brassica juncea* L.). *International Journal of Farm Sciences, 4*(2), 80–85.

Singh, D., Singh, B., & Kumar, V. (2020). Effect of varieties and sowing dates on yield attributes and economics of linseed (*Linum usitatissimum* L.). *Journal of Pharmacognosy and Phytochemistry, 9*(5), 2150–2154.

Singh, R. B., & Singh, R. N. (2011). Dates of sowing and varieties for the management of root-rot wilt complex of linseed (*Linum usitatissimum* L.). *Indian Journal of Agricultural Sciences, 81*(3), 287–289.

Singh, U., Tomar, S., Rameshwar, S., & Choudhary, S. (2015). Yield, nutrient uptake and economics of Indian mustard as influenced by varieties, sources and levels of sulphur. *Annals of Plant and Soil Research, 17*(3), 266–268.

Sulas, L., Re, G. A., Sanna, F., Bullitta, S., & Piluzza, G. (2019). Fatty acid composition and antioxidant capacity in linseed grown as forage in Mediterranean environment. *Italian Journal of Agronomy, 14*(1), 1291. https://doi.org/10.4081/ija.2019.1291

Tiwari, R. K., Singh, P., & Mishra, A. (2018). Effect of sowing dates on growth, yield and quality of linseed (*Linum usitatissimum* L.) under varying agro-climatic conditions. *Journal of Oilseed Research, 35*(2), 85–89.

Verma, A. K., Yadav, R. S., & Kumar, D. (2019). Performance of linseed varieties under different environmental conditions. *Journal of Pharmacognosy and Phytochemistry, 8*(4), 2345–2349.

Yadav, M., Patel, P. K., & Kushwaha, H. S. (2021). Evaluation of linseed varieties for yield and yield attributes under different agro-climatic zones. *International Journal of Current Microbiology and Applied Sciences, 10*(6), 1120–1126.

How to Cite this Article: Shah A., Singhad A., Sarvade S., Bajpai R., Agrawal S.B., Khare A.K., Handa A.K.. (2026). Evaluation of Linseed Varietal Response to Different Sowing Dates Under Mango Based Agri-horticulture System. *Indian Journal of Agroforestry*, ***28***(2), 66-71. https://doi.org/10.48165/ija.2026.28.02.08