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Effect of time of sowing on yield of linseed (*Linum usitatissimum* L.) varieties in Uttar Bastar Kanker district of Chhattisgarh

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Abstract

A field experiment was conducted at Instructional cum Research Farm, Ramprasad Potai College of Agriculture & Research Station, Singarbhat, Kanker, District-Uttar Bastar Kanker, (C.G.) during *rabi* season of 2021-22 and 2022-23. The soil of experimental site was sandy loam, with low in available nitrogen (131.71 kg ha⁻¹) and available phosphorus (10.83 kg ha⁻¹) and medium in available potassium (190.67 kg ha⁻¹) and organic carbon (0.52%) and neutral in reaction (6.5 pH). This experiment was conducted under split plot design. Four different times of sowing viz., T₁: 1st week of November, T₂: 3rd week of November, T₃: 1st week of December and T₄: 3rd week of December were taken in the main plot. Main plots were divided into as sub-plots and four varieties viz., V₁: RLC-92, V₂: RLC-143, V₃: RLC-133 and V₄: JLS-95 were sown in sub plot of each main plot and replicated three times. Crop sown in the 1st week of November recorded significantly higher number of filled capsules plant⁻¹, total number of capsules plant⁻¹, number of seeds capsule⁻¹, test weight, seed yield, stover yield and harvest index. Linseed variety RLC-92 produced significantly higher number of filled capsules plant⁻¹, number of seeds capsule⁻¹, test weight, seed yield, stover yield and harvest index.

Keywords: Time of sowing, linseed, varieties, yield attributes and yield

Introduction

Linseed is an important oilseed and fibre crop in the world. Linseed is one of the most important industrial oilseed crops of India and stands next to rapeseed-mustard in *rabi* oilseeds in area and production. In India, it is grown mainly for seeds, used for extracting oil. In industrial oil production, it ranks first in the country. Seeds are directly used for edible purposes on a very small scale. Linseed plants are small, hardy and require less management. It is such a valuable crop that every part of the linseed plant is utilized commercially, either directly or after processing. Seeds contain about 33 to 45% oil, fat 41-42%, protein 18-20%, Dietary fibre 27-28%, carbohydrate 29%, sugar 1.5% and water 7%. Linseed fibre is used for manufacturing of linen. Stover and short fibres may be used as raw pulp for making paper of quality comparable with that of currency notes. The oil is rich (>66%) in linolenic acid, and is a perfect drying oil. Hence it is utilized in the manufacture of paints, oil cloth, varnish, pad-ink, printed ink, linoleum etc. Linseed oil is the richest plant source of linoleic (omega-6) and linolenic (omega-3) poly unsaturated fatty acids (PUFA), which are essential fatty acids for human beings since they cannot be synthesized in the organism and must be obtained from food and have several human health benefits.

It is grown in our country under both rainfed and irrigated conditions and also cultivated as an Utera system. Linseed is an important *rabi* season oilseed crop, next to rapeseed and mustard for economic importance. In India, linseed is cultivated in an area of nearly 2.39 lakh hectares, producing around 1.67 lakh tonnes seed, with an average productivity of 698 kg ha⁻¹. In Chhattisgarh state, the area under linseed cultivation is very low and nearly 0.08 lakh hectare with 0.03 lakh tonnes production and poor productivity of 385 kg ha⁻¹ (Anonymous, 2025) [1]. The reason for low productivity is poor crop management practices, age-old varieties and delayed sowing. Productivity can be increased by adopting improved agronomic practices and varieties sown at optimum time. Linseed crop under semi-arid region when sown during mid-

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November encountered favorable environmental conditions resulting in higher yields as compared to delayed sowing. In Bastar Plateau region of Chhattisgarh not much work has been done on linseed crop. Therefore, it becomes imperative to undertake the study to find out the optimum sowing time for promising linseed varieties in Uttar Bastar Kanker district of Chhattisgarh.

Materials and Methods

A field experiment was conducted at Instructional cum Research Farm, Ramprasad Potai College of Agriculture & Research Station, Singarbhata, Kanker, District-Uttar Bastar Kanker, (C.G.) during *rabi* season of 2021-22 and 2022-23. The soil of experimental site was sandy loam, with low in available nitrogen ($131.71 \text{ kg ha}^{-1}$) and available phosphorus (10.83 kg ha^{-1}) and medium in available potassium ($190.67 \text{ kg ha}^{-1}$) and organic carbon (0.52%) and neutral in reaction (6.5 pH). This experiment was conducted under split plot design. Four different times of sowing viz., T₁: 1st week of November, T₂: 3rd week of November, T₃: 1st week of December and T₄: 3rd week of December were taken in the main plot. Main plots were divided into sub-plots and four varieties viz., V₁: RLC-92, V₂: RLC-143, V₃: RLC-133 and V₄: JLS-95 were sown in sub plot of each main plot and replicated three times. Two tonnes FYM and recommended dose of nutrients 60,30,30,20 kg N, P₂O₅, K₂O, S ha⁻¹ were applied. Half of the nitrogen and full doses of P₂O₅, K₂O and S were applied as basal and remaining ½ N applied after first irrigation about 30-35 DAS in the crop. Linseed varieties were grown with recommended package of practices under irrigated condition.

Results and Discussion

Number of filled capsule plant⁻¹ and total number of capsule plant⁻¹

Among the various time of sowing, crop sown in the 1st week of November produced significantly higher number of filled capsules plant⁻¹ and total number of capsules plant⁻¹, which were at par with crop sown in the 3rd week of November during both the years and on mean basis. Lowest number of filled capsules plant⁻¹ and total number of capsules plant⁻¹ were recorded with crop sown in the 3rd week of December during both the years and on mean basis. Similar results were obtained by Bhalavi *et al.* (2023) [3], Narra *et al.* (2021) [7] and Alam *et al.* (2025) [2].

Among the varieties, significantly higher number of filled capsules plant⁻¹ was observed with variety RLC-92 during 2021-22 and on mean basis and it was found to be at par with variety JLS-95, while variety JLS-95 recorded significantly higher number of filled capsules plant⁻¹ during 2022-23, which was found at par with variety RLC-92. Whereas, variety JLS-95 recorded significantly higher total number of capsules plant⁻¹ which was found to be at par with variety RLC-92 during both the years and on mean basis. Lowest number of capsules plant⁻¹ and total number of capsules plant⁻¹ recorded with variety RLC-133. Similar results were also obtained by Durgeshwari *et al.* (2023) [4], Kumar *et al.* (2022) [5], Sahu *et al.* (2021) [8] and Sahu *et al.* (2020) [9].

Number of seeds capsule⁻¹ and test weight

Number of seeds capsule⁻¹ was recorded significantly higher in crop sown in the 1st week of November which was at par with 3rd week of November sowing whereas, lowest number of seeds capsule⁻¹ was recorded with crop sown in the 3rd week of December during 2022-23 and on mean basis. All the time of sowing recorded equal number of seeds capsule⁻¹ during 2021-

22. Similar results were also reported by Bhalavi *et al.* (2023) [3], Narra *et al.* (2021) [7] and Alam *et al.* (2025) [2]. In case of varieties, variety RLC-92 recorded significantly higher number of seeds capsule⁻¹ which was at par with variety RLC-133 during 2021-22 and on mean basis. Whereas, variety RLC-133 recorded significantly higher number of seeds capsule⁻¹ during 2022-23 and it was found to be at par with both varieties RLC-192 and RLC-143. Lowest number of seeds capsule⁻¹ was recorded in variety JLS-95 during both the years and on mean basis. Durgeshwari *et al.* (2023) [4], Kumar *et al.* (2022) [5], Sahu *et al.* (2021) [8] and Sahu *et al.* (2020) [9].

Crop sown on both 1st week of November and 3rd week of November were recorded significantly higher equal test weight during both the years and on mean basis, which was found at par with 1st week of December sowing. Crop sown on 3rd week of December recorded lowest test weight during both the years and on mean basis. Similar results were also reported by Bhalavi *et al.* (2023) [3], Narra *et al.* (2021) [7] and Alam *et al.* (2025) [2]. In case of varieties, both varieties RLC-92 and JLS-95 were recorded significantly higher equal test weight during 2021-22 and on mean basis, which was at par with variety RLC-133. Similarly, variety JLS-95 recorded significantly higher test weight during 2022-23, which was found at par with both varieties RLC-92 and RLC-133. Variety RLC-143 recorded lowest test weight during both the years and on mean basis. Similar findings were also reported by Durgeshwari *et al.* (2023) [4], Kumar *et al.* (2022) [5] and Sahu *et al.* (2021) [8] and Sahu *et al.* (2020) [9].

Yields and harvest index

Among the various time of sowing, crop sown in the 1st week of November resulted in significantly higher seed yield which was statistically at par with 3rd week of November sowing during both the years and on mean basis. Crop sown on 1st week of November resulted in significantly higher stover yield, which was statistically at par with 3rd week of November sowing during 2021-22 and on mean basis and also found at par with 1st week of December sowing on mean basis. Whereas, crop sown in the 3rd week of November resulted in significantly higher stover yield during 2022-23, which was found to be at par with crop sown on 1st week of November and 1st week of December. Crop sown on 1st week of November resulted in significantly higher biological yield which was statistically at par with crop sown on 3rd week of November during 2021-22 and on mean basis. Similarly, crop sown on 1st week of November and 3rd week of November both were recorded significantly higher equal biological yield which was found at par with 1st week of December sowing during 2022-23. Crop sown on 1st week of November resulted in significantly higher harvest index (%), which was statistically at par with crop sown in the 3rd week of November during both the years and on mean basis. Whereas, crop sown in the 3rd week of December resulted in the lowest seed yield, stover yield, biological yield and harvest index during both the years and on mean basis. Similar results have also been reported by Bhalavi *et al.* (2023) [3], Narra *et al.* (2021) [7], Alam *et al.* (2025) [2], Kumhare *et al.* (2022) [6], Sunita Kumari (2019) [5] and Maurya *et al.* (2017). As regards varieties, variety RLC-92 produced significantly highest seed yield, stover yield, biological yield and harvest index, while variety RLC-133 produced significantly lowest seed yield, stover yield and biological yield during both the years and on mean basis. These findings are similar to that of Durgeshwari *et al.* (2023) [4], Kumar *et al.* (2022) [5], Sahu *et al.* (2021) [8] and Sahu *et al.* (2020) [9].

Table 1: Yield attributes of linseed varieties as influenced by various time of sowing

Treatment	Yield attributes											
	No. of filled capsules plant ⁻¹			Total No. of capsules plant ⁻¹			No. of seeds capsule ⁻¹			Test weight (g)		
	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean
Time of sowing												
T ₁ : 1 st week of November	46.1	35.0	40.6	54.9	41.3	48.1	7.2	7.8	7.5	6.7	6.6	6.7
T ₂ : 3 rd week of November	44.4	34.8	39.6	54.5	41.2	47.9	7.2	7.5	7.4	6.7	6.6	6.7
T ₃ : 1 st week of December	29.5	27.3	28.4	38.0	32.7	35.4	7.2	7.2	7.2	6.6	6.5	6.6
T ₄ : 3 rd week of December	17.0	23.0	20.0	22.9	27.9	25.4	7.2	7.0	7.1	6.2	6.0	6.1
SEm ±	0.9	0.7	0.7	1.0	0.8	0.8	0.2	0.1	0.1	0.1	0.1	0.1
CD (P = 0.05)	3.0	2.5	2.3	3.4	2.7	2.6	NS	0.5	0.2	0.3	0.4	0.3
Varieties												
V ₁ : RLC- 92	39.1	35.8	37.5	48.2	43.0	45.6	7.9	7.7	7.8	7.3	7.1	7.2
V ₂ : RLC- 143	31.1	23.7	27.4	37.2	27.7	32.5	7.0	7.4	7.2	4.7	4.6	4.7
V ₃ : RLC- 133	30.1	23.3	26.7	36.6	27.5	32.1	7.5	8.0	7.7	7.0	6.8	6.9
V ₄ : JLS- 95	36.7	37.1	36.9	48.3	44.9	46.6	6.5	6.4	6.4	7.3	7.2	7.2
SEm ±	0.8	0.6	0.5	0.9	0.6	0.5	0.2	0.2	0.1	0.1	0.2	0.1
CD (P = 0.05)	2.4	1.9	1.4	2.6	1.8	1.3	0.5	0.6	0.4	0.3	0.4	0.4
Interaction (T x V)	S	S	S	S	S	S	NS	NS	NS	NS	NS	NS

Table 2: Yields and harvest index of linseed varieties as influenced by various time of sowing

Treatment	Seed yield (kg ha ⁻¹)			Stover yield (kg ha ⁻¹)			Biological yield (kg ha ⁻¹)			Harvest index (%)		
	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean
Time of sowing												
T ₁ : 1 st week of November	916	847	882	1618	1582	1600	2534	2429	2482	35.9	34.6	35.3
T ₂ : 3 rd week of November	883	838	861	1592	1595	1594	2475	2434	2454	35.5	34.2	34.9
T ₃ : 1 st week of December	703	739	721	1482	1557	1519	2184	2296	2240	32.0	31.9	32.0
T ₄ : 3 rd week of December	547	594	570	1387	1429	1408	1934	2023	1978	28.2	29.2	28.7
SEm ±	18	19	14	36	34	34	39	46	41	0.8	0.6	0.5
CD (P = 0.05)	62	64	49	124	119	117	136	159	143	2.6	1.9	1.8
Varieties												
V ₁ : RLC- 92	983	980	982	1626	1634	1630	2609	2615	2612	37.4	37.3	37.3
V ₂ : RLC- 143	690	675	682	1530	1502	1516	2220	2177	2198	30.6	30.6	30.6
V ₃ : RLC- 133	641	646	644	1359	1431	1395	2001	2077	2039	31.9	31.1	31.5
V ₄ : JLS- 95	734	717	726	1563	1596	1580	2298	2313	2305	31.8	31.0	31.4
SEm ±	12	13	10	32	26	25	31	28	24	0.7	0.6	0.5
CD (P = 0.05)	35	38	28	95	74	72	90	82	70	1.9	1.6	1.5
Interaction (T x V)	S	S	S	S	S	S	S	S	S	S	S	S

Conclusion

On the basis of experimental findings, it is concluded that the crop sown in the 1st week of November and 3rd week of November both proved superior over December sown crop for seed and stover yield. Variety RLC-92 sown upto 3rd week of November could be recommended for higher productivity and profitability of linseed for the district of Uttar Bastar, Kanker of Chhattisgarh.

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