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Effect of nutrient management practices on yield attributes and yield of linseed 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, Singarbat, 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 in Randomized complete block design. Eleven nutrient management treatment viz. T₁: 50% RDF, T₂: 75% RDF, T₃: 100% RDF (60,30,30,20 kg N, P₂O₅, K₂O, S ha⁻¹), T₄: Soil test-based fertilizer recommendation (90,45,30 kg N, P₂O₅, K₂O ha⁻¹), T₅: 50% recommended dose of nitrogen of RDF, T₆: 75% recommended dose of nitrogen of RDF, T₇: T₁ + Two spray of nano urea @ 3ml litre⁻¹ of water at flower initiation and capsule formation stage, T₈: T₂ + Two spray of nano urea @ 3ml litre⁻¹ of water at flower initiation and capsule formation stage, T₉: T₃ + Two spray of nano urea @ 3ml litre⁻¹ of water at flower initiation and capsule formation stage, T₁₀: T₄ + Two spray of nano urea @ 3ml litre⁻¹ of water at flower initiation and capsule formation stage and T₁₁: Absolute control were allotted in each plot in three replication. Linseed variety RLC-92 grown with recommended package of practices under irrigated condition. The application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ along with two spray of nano urea resulted significantly higher number of filled capsules plant⁻¹, total number of capsules plant⁻¹, seed yield, stover yield and biological yield. The application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ resulted higher number of seeds capsule⁻¹, test weight, and harvest index.

Keywords: Nutrient management, linseed, yield attributes and yield

Introduction

Linseed (*Linum usitatissimum* L.) is one of the oldest crop plants cultivated in around 47 countries for the purpose of seed oil and fibre. Linseed has been an ancient crop but due to recent availability of various oils, it had taken a backseat in agrarian choice. These days linseed seeds are recommended to be eaten roasted and grinded because of rich source of Omega-3 fatty acids. Linseed seeds have been widely used in Indian cooking and cuisines from time immemorial and eaten as a supplement as well. Flax seeds are added to chutneys and breads like chapatis and parathas. Linseed is dual purpose crop. It yields oil from seeds and fibre from stem. Linseed is one of the important oilseed crops in India and stands next to rapeseed-mustard in *rabi* season oilseeds with respect to area and production. Linseed occupies an area of 2.39 lakh ha with a production 1.67 lakh tonnes and an average productivity of 698 kg ha⁻¹ in the country, whereas in Chhattisgarh, it occupies an area of 0.08 lakh ha with a production 0.03 lakh tonnes and productivity of about 385 kg ha⁻¹ (Anonymous, 2025)^[1]. The major linseed growing states in India are Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Maharashtra, Bihar, Odisha, Jharkhand, West Bengal, Nagaland and Assam accounting for about 97 percent of total area of the country. Chhattisgarh is one of the important linseed growing states of the country. It occupies 9 per cent of area under oilseeds and 6.29 per cent contribution to the total oilseed production of the country. The cultivation of linseed is restricted mostly on marginal and sub-marginal soils under rainfed condition, input starved conditions, no proper crop management, low market price and procurement support are some of the major factors leading to low productivity and profitability of the crop.

Low productivity of linseed may be ascribed to many reasons and poor management practices, but inadequate and imbalanced nutrient management, delayed sowing and age-old varieties are the major factor. To enhance the productivity of linseed, use of balanced nutrient management by the application of chemical fertilizer, along with organic manures is of great importance. Judicious application of nutrients particularly the nitrogen, phosphorus, potash and sulphur will not only help to sustain the linseed crop productivity but also effective for maintaining good soil health and increasing the nutrient use efficiency. Thus, there is need to test the response of promising varieties under different nutrient management practices.

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 in Randomized complete block design. Eleven nutrient management treatment viz. T₁: 50% RDF, T₂: 75% RDF, T₃: 100% RDF ($60,30,30,20 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O, S ha}^{-1}$), T₄: Soil test-based fertilizer recommendation ($90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$), T₅: 50% recommended dose of nitrogen of RDF, T₆: 75% recommended dose of nitrogen of RDF, T₇: T₁ + Two spray of nano urea @ 3 ml litre^{-1} of water at flower initiation and capsule formation stage, T₈: T₂ + Two spray of nano urea @ 3 ml litre^{-1} of water at flower initiation and capsule formation stage, T₉: T₃ + Two spray of nano urea @ 3 ml litre^{-1} of water at flower initiation and capsule formation stage, T₁₀: T₄ + Two spray of nano urea @ 3 ml litre^{-1} of water at flower initiation and capsule formation stage and T₁₁: Absolute control were allotted in each plot in three replication. Half of the nitrogen and full doses of P_2O_5 , K_2O and S were applied as basal in crop and remaining $\frac{1}{2}$ N applied after first irrigation about 30-35 DAS. Linseed variety RLC-92 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

Number of filled capsules recorded significantly higher in the application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea which was found to be at par with the application of 100% RDF along with two spray of nano urea and $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ during both the years and on mean basis and it was also found at par with the application of 100% RDF during both the years and with the application of 75% RDN of RDF during 2022-23. The application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea recorded significantly higher total number of capsules plant⁻¹ during both the years and on mean basis which was found to be at par with the application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ during 2021-22 and with the application of 100% RDF along with two spray of nano urea during 2022-23. Absolute control treatment recorded lowest number of filled capsule plant⁻¹ and total number of capsule plant⁻¹ during both the years and on mean basis. Similar results have also been reported by Wakudkar *et al.* (2024) [14], Durgeshwari *et al.* (2023) [4], Singh *et al.* (2023) [13], Gaikwad *et al.* (2020) [5], Patil *et al.* (2018) [10], Gupta *et al.* (2017) [6], Pohare *et al.* (2015) [11], Singh *et al.*

(2013) [12], Khajani *et al.* (2012) [7], Malik *et al.* (2008) [9] and Kushwaha *et al.* (2006) [8].

Number of seeds capsule⁻¹ and test weight

Number of seeds capsule⁻¹ and test weight both differed non-significantly due to various nutrient management practices during both the years and on mean basis. The application of both $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea and 100% RDF along with two spray of nano urea recorded higher number of seeds capsule⁻¹ followed by application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ and 100% RDF during 2021-22. Whereas, application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ recorded higher number of seeds capsule⁻¹ followed by application of 100% RDF during 2022-23. Similarly, on mean basis the application of both $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ and 100% RDF recorded higher number of seeds capsule⁻¹ followed by application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea. The application of both $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ and 75% RDF along with two spray of nano urea were recorded higher test weight followed by the application of 75% RDN of RDF, 100% RDF along with two spray of nano urea and 100% RDF during both the years and on mean basis. Absolute control treatment recorded lowest number of seeds capsule⁻¹ and test weight during both the years and on mean basis. Similar results have also been reported by Wakudkar *et al.* (2024) [14], Singh *et al.* (2023) [13], Gaikwad *et al.* (2020) [5], Patil *et al.* (2018) [10], Gupta *et al.* (2017) [6], Pohare *et al.* (2015) [11], Singh *et al.* (2013) [12], Khajani *et al.* (2012) [7] and Kushwaha *et al.* (2006) [8].

Seed yield

The seed yield significantly influenced due to various nutrient management practices (Table 2). The application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea resulted significantly higher seed yield which was found to be at par with the application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ and 100% RDF along with two spray of nano urea during both the years and on mean basis. Absolute control treatment resulted lowest seed yield during both the years and on mean basis. Similar results have also been reported by Wakudkar *et al.* (2024) [14], Durgeshwari *et al.* (2023) [4], Singh *et al.* (2023) [13], Gaikwad *et al.* (2020) [5], Patil *et al.* (2018) [10], Gupta *et al.* (2017) [6], Pohare *et al.* (2015) [11], Singh *et al.* (2013) [12], Khajani *et al.* (2012) [7], Kushwaha *et al.* (2006) [8], Choubey *et al.* (2003) [3] and Badiyala and Kumar (2003) [2].

Stover yield

The stover yield significantly influenced due to various nutrient management practices (Table 2). The application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ along with two spray of nano urea resulted significantly higher stover yield which was found to be at par with the application of $90,45,30 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ during both the years and on mean basis and also found at par with the application of 100% RDF along with two spray of nano urea during both the years. Absolute control treatment resulted lowest stover yield during both the years and on mean basis. Similar results have also been reported by Wakudkar *et al.* (2024) [14], Durgeshwari *et al.* (2023) [4], Singh *et al.* (2023) [13], Gaikwad *et al.* (2020) [5], Patil *et al.* (2018) [10], Gupta *et al.* (2017) [6], Pohare *et al.* (2015) [11], Singh *et al.* (2013) [12], Khajani *et al.* (2012) [7], Kushwaha *et al.* (2006) [8], Choubey *et al.* (2003) [3] and Badiyala and Kumar (2003) [2].

Biological yield

The Biological yield significantly influenced due to various nutrient management practices (Table 2). The application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ along with two spray of nano urea resulted significantly higher biological yield which was found to be at par with the application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ during both the years and on mean basis. Absolute control treatment resulted lowest biological yield during both the years and on mean basis. Similar results have also been reported by Wakudkar *et al.* (2024) [14], Durgeshwari *et al.* (2023) [4], Singh *et al.* (2023) [13], Gaikwad *et al.* (2020) [5], Patil *et al.* (2018) [10], Gupta *et al.* (2017) [6], Pohare *et al.* (2015) [11], Singh

et al. (2013) [12], Khajani *et al.* (2012) [7], Kushwaha *et al.* (2006) [8], Choubey *et al.* (2003) [3] and Badiyala and Kumar (2003) [2].

Harvest index

The harvest index influenced non significantly due to various nutrient management practices (Table 2). The application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ resulted higher harvest index followed by the application of 100% RDF during both the years and on mean basis. Absolute control treatment resulted lowest harvest index during both the years and on mean basis. Similar results have also been reported by Durgeshwari *et al.* (2023) [4], Singh *et al.* (2023) [13] and Gaikwad *et al.* (2020) [5].

Table 1: Yield attributes of linseed as influenced by various nutrient management practices

Treatment	Yield attributes											
	No. of filled capsules plant ⁻¹			Total No. of capsules plant ⁻¹			No. of seeds capsules ⁻¹			1000 seed test weight (g)		
	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean	2021-22	2022-23	Mean
T ₁ : 50% RDF	43.9	39.1	41.5	50.1	44.2	47.2	7.6	7.4	7.5	7.5	7.3	7.4
T ₂ : 75% RDF	45.8	42.3	44.1	55.4	51.3	53.3	7.6	7.4	7.5	7.5	7.4	7.4
T ₃ : 100% RDF (60,30,30,20 kg N, P ₂ O ₅ , K ₂ O, S ha ⁻¹)	48.5	47.0	47.7	56.8	56.4	56.6	8.0	8.3	8.2	7.5	7.4	7.5
T ₄ : Soil test-based fertilizer recommendation (90,45,30 kg N, P ₂ O ₅ , K ₂ O ha ⁻¹)	52.1	48.3	50.2	64.3	58.3	61.3	8.0	8.5	8.2	7.7	7.5	7.6
T ₅ : 50% recommended dose of nitrogen of RDF	46.0	41.1	43.6	54.8	49.8	52.3	7.7	7.7	7.7	7.5	7.3	7.4
T ₆ : 75% recommended dose of nitrogen of RDF	47.7	47.9	47.8	57.9	56.3	57.1	7.8	7.6	7.7	7.6	7.5	7.5
T ₇ : T ₁ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	44.7	43.1	43.9	53.7	53.2	53.5	7.5	7.3	7.4	7.5	7.3	7.4
T ₈ : T ₂ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	46.6	45.2	45.9	55.3	55.5	55.4	7.8	7.6	7.7	7.7	7.5	7.6
T ₉ : T ₃ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	50.0	51.8	50.9	58.7	63.4	61.1	8.1	7.9	8.0	7.6	7.4	7.5
T ₁₀ : T ₄ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	53.8	52.4	53.1	65.1	66.5	65.8	8.1	8.0	8.1	7.6	7.3	7.4
T ₁₁ : Absolute control	32.5	27.0	29.8	39.0	35.4	37.2	7.0	7.1	7.0	7.3	7.3	7.3
SEm ±	1.9	2.1	1.2	2.1	2.2	1.3	0.4	0.3	0.3	0.1	0.1	0.1
CD (P=0.05)	5.6	6.0	3.4	6.3	6.4	3.8	NS	NS	NS	NS	NS	NS

Table 2: Yields and harvest index of linseed as influenced by various nutrient management practices

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
T ₁ : 50% RDF	821.7	769.3	795.5	1733.3	1551.0	1642.2	2555.1	2320.3	2437.7	32.2	33.2	32.7
T ₂ : 75% RDF	918.8	881.3	900.1	1930.3	1773.3	1851.8	2849.1	2654.7	2751.9	32.3	33.2	32.8
T ₃ : 100% RDF (60,30,30,20 kg N, P ₂ O ₅ , K ₂ O, S ha ⁻¹)	1080.1	1012.7	1046.4	2254.7	2033.3	2144.0	3334.7	3046.0	3190.4	32.4	33.3	32.8
T ₄ : Soil test-based fertilizer recommendation (90,45,30 kg N, P ₂ O ₅ , K ₂ O ha ⁻¹)	1211.0	1138.7	1174.8	2517.6	2275.0	2396.3	3728.6	3413.7	3571.1	32.5	33.4	32.9
T ₅ : 50% recommended dose of nitrogen of RDF	941.6	896.0	918.8	2037.5	1811.3	1924.4	2979.1	2707.3	2843.2	31.6	33.1	32.3
T ₆ : 75% recommended dose of nitrogen of RDF	984.9	952.3	968.6	2163.3	1950.0	2056.7	3148.2	2902.3	3025.3	31.4	32.9	32.1
T ₇ : T ₁ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	894.0	832.5	863.2	1924.7	1683.0	1803.9	2818.6	2515.5	2667.1	31.9	33.1	32.4
T ₈ : T ₂ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	952.3	932.7	942.5	2041.3	1908.6	1974.9	2993.6	2841.3	2917.4	31.9	32.8	32.3
T ₉ : T ₃ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	1113.3	1061.7	1087.5	2350.0	2162.3	2256.2	3463.3	3224.0	3343.7	32.3	33.0	32.6
T ₁₀ : T ₄ + Two spray of nano urea @ 3ml litre ⁻¹ of water (Flower initiation + capsule formation)	1228.3	1165.0	1196.7	2610.0	2404.0	2507.0	3838.3	3569.0	3703.7	32.0	32.7	32.3
T ₁₁ : Absolute control	701.0	621.3	661.2	1558.3	1300.5	1429.4	2259.3	1921.8	2090.6	31.2	32.3	31.7
SEm ±	46.2	40.2	39.5	114.1	91.0	77.4	125.9	99.5	84.4	1.5	1.4	1.2
CD (P=0.05)	136.2	118.7	116.5	336.5	268.3	228.2	371.4	293.6	249.1	NS	NS	NS

Conclusion

On the basis of experimental findings, it is concluded that the application of 90,45,30 kg N, P₂O₅, K₂O ha⁻¹ along with two spray of nano urea and the application of 90,45,30 kg N, P₂O₅,

K₂O ha⁻¹ proved superior over rest of the nutrient management treatments for seed and stover yield. These treatments could be recommended for higher productivity and profitability of linseed for the district of Uttar Bastar, Kanker of Chhattisgarh state.

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References

1. Anonymous. Department of Agriculture & Farmers Welfare, Government of India. New Delhi; 2025.
2. Badiyala D, Kumar S. Effect of organic and inorganic fertilizers on growth and yield of linseed (*Linum usitatissimum*) under mid-hill conditions of Himachal Pradesh. Indian Journal of Agronomy. 2003;48(3):220-223.
3. Choubey NK, Shrivastava GK, Lakpale R, Tripathi RS. Effect of different cropping sequence and fertilizer levels on seed yield and economics of linseed under rainfed condition. In: ISOR National Seminar on Stress Management in Oilseed; 2003 Jan 28-30; p. 309-310.
4. Durgeshwari, Dwivedi SK, Bhambri MC, Samadhiya V. Study of spacing and nitrogen management practices on productivity of flax and dual purpose linseed varieties. The Pharma Innovation Journal. 2023;12(10):1811-1814.
5. Gaikwad SR, Suryavanshi VP, Bhusari SA, Misal AM. Effect of fertilizers on growth and yield of linseed (*Linum usitatissimum* L.) varieties. The Pharma Innovation Journal. 2020;9(10):127-131.
6. Gupta M, Kour S, Gupta V, Bharat R, Sharma C. Effect of different doses of fertilizers on yield and NPK uptake of linseed (*Linum usitatissimum* L.). Bangladesh Journal of Botany. 2017;46(2):575-581.
7. Khajani FP, Irannezhad H, Majidian M, Oraki H. Influence of different levels of nitrogen, phosphorus and potassium on yield and yield components of flax seed oil (*Linum usitatissimum* L.) variety Lirina. Journal of Medicinal Plants Research. 2012;6(6):1050-1054.
8. Kushwaha CI, Prasad K, Kushwaha SP. Effect of row spacing and nitrogen doses on yield attributes and yield of linseed varieties under irrigated condition of Bundelkhand. Plant Archives. 2006;6(2):741-743.
9. Malik YP, Hussain K, Alam K. Impact of spacings and fertilizer application on linseed and infestation of bud fly, *Dasyneura lini* Barnes. Journal of Oilseeds Research. 2008;25(1):106-107.
10. Patil SS, Ransing SS, Hiwale SD, Rasal SJ. Effect of phosphorus and sulphur management on growth and yield attributes of linseed. International Journal of Current Microbiology and Applied Sciences. 2018;6:1147-1155.
11. Pohare VB, Raundal PU, Bhondave TS. Effect of NPK levels on linseed under plain zone of Maharashtra. Journal of Agricultural Research and Technology. 2015;40:528-532.
12. Singh DN, Bohra JS, Singh JK. Influence of NPK, S and variety on growth, yield and quality of irrigated linseed (*Linum usitatissimum*). Indian Journal of Agricultural Sciences. 2013;83(4):456-458.
13. Singh P, Pandey TD, Tiwari RB, Sao Y, Chaure NK. Effect of integrated nutrient management on growth and yield of linseed in Chhattisgarh plain. International Journal of Statistics and Applied Mathematics. 2023;8(4):424-426.
14. Wakudkar PJ, Nagrare IM, Kusumbe DT. Effect of nutrient management on growth and yield of linseed. International Journal of Research in Agronomy. 2024;7(7):490-492.