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Shekhar Kaushik
M.Sc. Final Year, Dept. of Agronomy, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

RB Tiwari
Professor, Dept. of Agronomy, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

Dinesh Pandey
Scientist, Dept. of Agronomy, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

Yushma Sao
Associate professor, Dept. of Soil Science & Agri. Chemistry, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

NK Chaure
Principal Scientist, Dept. of Agricultural Statistics, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

Raj Pratap Singh Bhadoria
M.Sc. Previous Year, Dept. of Agronomy, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

Corresponding Author:
Shekhar Kaushik
M.Sc. Final Year, Dept. of Agronomy, BTC College of Agriculture and Research Station, Bilaspur, Chhattisgarh, India

Effect of fertilizer doses and foliar application of NPK on growth and yield of Finger millet (*Eleusie coracana* L. Gaertn)

Shekhar Kaushik, RB Tiwari, Dinesh Pandey, Yushma Sao, NK Chaure and Raj Pratap Singh Bhadoria

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Abstract
The present investigation entitled "Effect of fertilizer doses and foliar application of NPK on growth and yield of Finger millet (Eleusine coracana L. Gaertn)" was conducted during the Kharif season of 2025 at the Instructional Farm, Barrister Thakur Chhedilal College of Agriculture and Research Station, Sarkanda, Bilaspur (Chhattisgarh). The experiment was laid out in a Randomized Block Design with seven treatments and three replications using the variety CG Ragi-2. Different combinations of recommended fertilizer dose (RDF) and foliar application of NPK (19:19:19) were evaluated. The results showed that T_3 (100% RDF + NPK (19:19:19) foliar spray once at 30 DAS) significantly improved growth, yield attributes, yield, nutrient uptake, and economics over other treatments. It recorded the highest grain yield (2307.20 kg ha^{-1}), straw yield (4225.05 kg ha^{-1}), gross return (₹1,23,292.50 ha^{-1}), net return (₹86,040.45 ha^{-1}), and benefit-cost ratio (3.30). Treatments T_2 (100% RDF) and T_5 (75% RDF + two foliar sprays) were the next best performers. Nutrient uptake was significantly enhanced under integrated soil and foliar nutrition, while post-harvest soil pH, EC, and organic carbon remained unaffected. The study concluded that 100% RDF supplemented with one foliar spray of NPK (19:19:19) at 30 DAS is the most effective nutrient management practice for improving productivity and profitability of finger millet under Chhattisgarh conditions.

Keywords: Finger millet, RDF, NPK (19:19:19), foliar spray, growth, yield, nutrient uptake, economics

Introduction
Finger millet (*Eleusine coracana* (L.) Gaertn.) is an important cereal and nutri-cereal crop in India, serving as a staple food and a rich source of nutrients for millions of people. It belongs to the family Poaceae (Gramineae) and has a diploid chromosome number of 2n = 4x = 36. Finger millet is valued for its high calcium content, adaptability to diverse agro-climatic conditions and tolerance to drought, making it an important crop for sustainable agriculture and nutritional security. Finger millet is a vital staple food crop in central and eastern Africa as well as India. It is particularly beneficial for diabetic patients because of its low sugar content and slow glucose release, helping to regulate blood sugar levels (Kang *et al*., 2008) [5]. The grain is gluten-free, rich in essential amino acids, and possesses antioxidant properties. Additionally, finger millet consumption may reduce the risk of lifestyle-related diseases such as diabetes, hypertension, and cardiovascular disorders. Finger millet is a rich source of calcium, phosphorus, and iron. It has gained attention due to its functional components like slowly digestible starch and resistant starch, which offer health benefits. Additionally, finger millet provides high-quality protein along with essential amino acids, vitamin A, vitamin B, and phosphorus (Gopalan *et al*., 2004) [4]. It is nutritionally superior to rice and wheat, offering higher levels of minerals, dietary fiber, and micronutrients. Finger millet is notably rich in calcium (350–400 mg/100 g) and iron, which helps to prevent anemia. Its grain composition includes approximately 81.5% carbohydrates, 9.8% protein, 4.3% crude fiber, 2.7% minerals, 1–2% fat, along with significant amounts of calcium (0.38%), iron (3–20%), and vitamins such as B-complex vitamins-especially niacin, pyridoxine, and folic acid (Gull *et al.*, 2014). In India the total area under finger millet is 1162 thousand hectares (Anonymous, 2023- 24) [2].

From this area, 1692 thousand tons of finger millet was produced in 2023-24 and productivity of finger millet was recorded as 1456 Kg per hectare. In Chhattisgarh the total area under finger millet cultivation was 6.29 thousand hectares with production 2.87 thousand tons of finger millet and the productivity of finger millet was recorded as 546.7 kg per hectare (Directorate of economics and statistics, 2021-22).

Fertilizers play vital role in Indian agriculture, but they also represent a significant financial burden. The Indian fertilizer industry is an integral part of agriculture sector. A significant rise in global fertilizer demand is driving up prices. Substantially addressing this level of demand presents a significant obstacle to optimal crop production. Fertilizer consumption in India has shown a gradual upward trend over time. However, a significant portion of these nutrients is not efficiently utilized by crops. Current estimates suggests that only 15-20% of applied P, 30-50% of N, 40-60% of K, 8-12% for S, 2-5% for applied Zn, 1-2% of Fe and 1-2% of applied Cu were utilized by the crop. Among the major nutrients, nitrogen (N) is one of the important one under irrigated condition. Nitrogen is essential for plant growth, particularly in chlorophyll production, which is crucial for photosynthesis. It also promotes vegetative growth, with critical needs during early stages like tillering and panicle initiation stage in finger millet. Larger and heavier grains per panicle can be achieved if the nitrogen is applied during panicle initiation or early booting stages. Nitrogen is an essential constituent of various enzymes, which play a vital role in catalysing and controlling plant growth processes (Sinfield *et al*., 2010) [9]. Therefore, nitrogen is a critical factor for finer millet and metabolism. Phosphorus (P), is an essential macronutrient, and plays a major role in growth and the development of the plant. Potassium (K), functioning as an activator of diverse array of enzymes, plays a significant role in intracellular osmotic regulation and the transport of proteins across cellular membranes, thereby contributing to essential cellular functions.

Foliar application of nutrients enhances their uptake during the critical growth stages, thereby stimulating increased physiological activity and ultimately leading to a significant enhancement in yield (Kundu and Sarkar, 2009). Alam *et al*., (2010) suggested that foliar application should be considered as an additional method to the primary application of nutrients to the soil. Foliar application of fertilizers could be 6-20 times more effective than soil application based on the soil characteristics (Arif *et al*., 2006) [1]. The effects of foliar fertilizer application on growth, yield economic viability, and nutrient uptake in rice plant. The combined approach, incorporating recommended fertilizers in to the soil along with foliar application of nutrients through NPK 19:19:19, resulted in a significant enhancement in grain yield (Rani *et al*., 2014) [8].

Materials and methods

Experimental site and Location: During the *kharif* season of 2025, the experiment was carried out at the Agriculture Research Cum Instructional Farm, Barrister Thakur Chhedilal College of Agriculture and Research Bilaspur (C.G.). The location of the Bilaspur district is latitude 22.09˚N and longitude 82.15˚E. This area is classified as India's Eastern Plateau and Hill Region (Agro-climatic zone VII). The state of Chhattisgarh is divided into three agro-climatic zones; Bilaspur is located in the state's plains zone.

Climate Condition: During the experimental period, the area experienced moderate to warm temperatures, with average daily temperatures ranging between 26.1°C to 34°C and relative humidity fluctuating between 61.1% to 88.9%. Rainfall during the crop growth period was 1264.2 mm and the crop was grown under irrigated conditions.

Treatment Details: The experiment was laid out in Randomized Block Design with three replications. The treatments consisted of seven nutrient management practices *viz.*,: T_1 - Control, T_2 -100% RDF (60:40:30 kg NPK ha^{-1}), T_3 -100% RDF + NPK Foliar spray (19:19:19) once (30 DAS), T_4 -75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS), T_5 -75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS), T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS), T_7 - 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS).

Observations on plant population, plant height, dry matter accumulation, number of tillers per meter row length, CGR, RGR, panicle length, test weight, grain yield and straw yield of finger millet crop were recorded at harvest and statistically analyzed. Economics of finger millet as a cost of cultivation, net return, gross return and benefit cost ratio were also worked out.

Statical Analysis: The data collected for all the characters were subjected to statistical analysis as per the procedure of Randomized Block Design with factorial concept in OPSTAT. The 'F' test was used for test of significance. The Standard Error of Mean (S.Em.±) was computed in each case. For the treatment effects which were found significant, critical difference (C.D.) at 5 per cent level of probability was worked out to compare the treatments mean.

Table 1: Details of treatment combinations

S. No.	Treatments
T_1	Control
T_2	100% RDF (60:40:30 kg NPK ha^{-1})
T_3	100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)
T_4	75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)
T_5	75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)
T_6	50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)
T_7	50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)

Results and Discussion

Growth Parameters

Plant population (m^{-2})

Statistical analysis indicated that the differences in plant population among treatments were non-significant at both stages of observation. Nevertheless, notable numerical variation was recorded.

Plant height (cm)

Plant height was found significant during different crop growth stages. The plant height of Finger Millet was measured at 30, 60, 90 DAS and at harvest. The maximum plant height at 30 DAS (45.75 cm) was recorded under

treatment T_3 (100% RDF + NPK Foliar spray 19:19:19 once at 30 DAS) followed closely by T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) 45.51 cm. At 60 DAS, the tallest plants (85.87 cm) were observed in treatment T_3 (100% RDF + NPK Foliar spray 19:19:19 once at 30 DAS) followed by T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) 82.33 cm and T_5 (75% RDF + NPK Foliar spray (19:19:19) twice at 30 and 50 DAS) 80.50 cm. At 90 DAS, the highest plant height (132.53 cm) was again seen under T_3, followed by T_2 (128.01 cm) and T_5 (125.80 cm). At harvest, the maximum plant height (136.53 cm) was observed in T_3, followed by T_2 (132.01 cm) and T_5 (129.80 cm).The minimum plant height was consistently recorded under treatment T_1 (Control), with values of 24.40 cm at 30 DAS, 53.90 cm at 60 DAS, 91.78 cm at 90 DAS and 95.78 cm at harvest.

Number of tillers (per meter row length)

The Number of tillers (per meter row length) in Finger Millet varied significantly across different treatment. At harvest, the maximum Number of tillers (m^{-1} length) (46.91) was recorded under treatment T_3 (100% RDF + NPK Foliar spray 19:19:19 once at 30 DAS) followed closely by T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) 44.56 and T_5 (75% RDF + NPK Foliar spray (19:19:19) twice at 30 and 50 DAS) 42.26. The minimum Number of tillers was consistently recorded under treatment T_1 (Control), with a value of 17.90 at harvest. Overall, treatment T_3 showed superior performance in terms of tiller production.

Plant dry matter accumulation (g plant^{-1})

The study on plant dry matter accumulation (g $plant^{-1}$) in Finger Millet was conducted at four critical growth stages 30, 60, and 90 DAS and at harvest. The maximum plant dry matter accumulation at 30 DAS (7.02 g $plant^{-1}$) was recorded under treatment T_3 (100% RDF + NPK Foliar spray 19:19:19 once at 30 DAS) followed closely by T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) 6.88 g $plant^{-1}$ and T_5 (75% RDF + NPK Foliar spray (19:19:19) twice at 30 and 50 DAS) 5.73 g $plant^{-1}$. At 60 DAS, the highest plant dry matter accumulation (19.30 g $plant^{-1}$) was observed in treatment T_3 (100% RDF + NPK Foliar spray 19:19:19 once at 30 DAS) followed by T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) 18.14 g $plant^{-1}$ and T_5 (75% RDF + NPK Foliar spray (19:19:19) twice at 30 and 50 DAS) 17.51 g $plant^{-1}$. At 90 DAS, the highest plant dry matter accumulation (37.43 g $plant^{-1}$) was again seen under T_3, followed by T_2 (36.00 g $plant^{-1}$) and T_5 (34.03 g $plant^{-1}$). At harvest, the maximum plant dry matter accumulation (43.76 g $plant^{-1}$) was observed in T_3, followed by T_2 (41.36 g $plant^{-1}$) and T_5 (39.66 g $plant^{-1}$). The minimum plant dry matter accumulation was consistently recorded under treatment T_1 (Control), with values of 3.03 g $plant^{-1}$ at 30 DAS, 7.24 g.$plant^{-1}$ at 60 DAS, 16.34 g $plant^{-1}$ at 90 DAS and 21.10 g $plant^{-1}$ at harvest.

Panicle length (cm)

Panicle length was significantly influenced by the application of NPK foliar spray at various concentrations and timings. Among the treatments, the maximum panicle length (12.24 cm) was observed in treatment T_3, which included (100% RDF + NPK foliar spray once at 30 DAS). This was followed closely by T_2 (11.57 cm), where (100% RDF alone) and T_5 (10.80 cm) 75% RDF + NPK foliar spray twice at 30 and 50 DAS, which was statistically superior over T_4 (75% RDF + NPK foliar spray (19:19:19) once at 30 DAS) (9.05 cm), T_6 (50% RDF + NPK foliar spray (19:19:19) once at 30 DAS) (6.92 cm), T_7 (50% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (8.63 cm) and while the lowest was observed in the T_1 (Control) (4.94 cm).

Test Weight (g)

Application of RDF and NPK foliar sprays significantly influenced test weight. The highest test weight (3.74 g) was recorded under treatment T_3, which involved (100% RDF + NPK foliar spray once at 30 DAS). This was followed closely by T_2 (3.63 g), where 100% RDF alone was applied and T_5 (3.56 g), which received 75% RDF + NPK foliar spray twice at 30 and 50 DAS. The control treatment (T_1), where neither RDF nor foliar sprays were applied, recorded the lowest test weight of 2.54 g.

Grain yield (kg ha^{-1})

Grain yield was significantly affected by the application of different nutrient treatments. The highest grain yield of 2307.20 kg ha^{-1} was recorded in treatment T_3, which involved (100% RDF + NPK foliar spray once at 30 DAS). This was followed closely by T_2 (2177.00 kg ha^{-1}), where 100% RDF alone was applied and T_5 (2099.46 kg ha^{-1}), which received 75% RDF + NPK foliar spray twice at 30 and 50 DAS. The control treatment (T_1), with no RDF or foliar spray, recorded the lowest yield of 668.20 kg ha^{-1}.

Straw yield (Kg ha^{-1})

The highest straw yield of 4225.05 kg ha^{-1} was recorded in treatment T_3, which involved (100% RDF + NPK foliar spray once at 30 DAS). This was followed closely by T_2 (4077.52 kg ha^{-1}), where 100% RDF alone was applied and T_5 (3954.31 kg ha^{-1}), which received 75% RDF + NPK foliar spray twice at 30 and 50 DAS. The lowest straw yield (Control), with values of 3.03 g $plant^{-1}$ at 30 DAS, 7.24 g was observed under the control treatment (T_1) at 1465.72 kg ha^{-1}, indicating minimal biomass accumulation without fertilizer input.

Harvest index (%)

In terms of the harvest index (HI), which represents the proportion of total biomass converted to grain yield, the highest value was recorded under T_3 (35.30%), indicating superior partitioning of biomass towards grain production. This was followed closely by T_2 (34.80%) involving 100% RDF alone and T_5 (34.70%), involving 75% RDF + NPK foliar spray twice at 30 and 50 DAS. The lowest harvest index was recorded in the control treatment (T_1) with an HI of 31.22%, highlighting the limited efficiency of grain production without any nutrient supplementation**.**

NPK Content and Uptake

NPK Content

The highest total nitrogen content was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 1.10%, which was statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) (1.04%) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (0.98%). The lowest total nitrogen content was recorded in T_1 (Control) (0.43%). The highest total phosphorus content was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 0.409%, which was

statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) (0.385%) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (0.371%). The lowest total phosphorus content was recorded in T_1 (Control) (0.164%). The highest total potassium content was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 0.79%, which was statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) (0.76%) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (0.73%). The lowest total potassium content was recorded in T_1 (Control) (0.27%).

NPK Uptake

The highest total nitrogen uptake was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 71.85 kg ha^{-1}, which was statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1}) (65.04 kg ha^{-1}) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (59.32 kg ha^{-1}). The lowest total nitrogen uptake was recorded in T_1 (Control) (9.17 kg ha^{-1}).

The highest total phosphorus uptake was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 26.71 kg ha^{-1}, which was statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) (24.07 kg ha^{-1}) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (22.45 kg ha^{-1}). The lowest total phosphorus uptake was recorded in T_1 (Control) (3.49 kg ha^{-1}).

The highest total potassium uptake was recorded under T_3 (100% RDF + NPK foliar spray (19:19:19) once at 30 DAS) with 51.60 kg ha^{-1}, which was statistically at par with T_2 (100% RDF (60:40:30 kg NPK ha^{-1})) (47.53 kg ha^{-1}) and T_5 (75% RDF + NPK foliar spray (19:19:19) twice at 30 and 50 DAS) (44.19 kg ha^{-1}). The lowest total potassium uptake was recorded in T_1 (Control) (5.76 kg ha^{-1}).

Table 2: Effect of fertilizer doses and foliar application of NPK on Finger millet (*Eleusie coracana* L. Gaertn) on plant population at 30 DAS, at harvest and number of tillers (per meter row length) at Harvest

Treatments	Plant population (m^{-2})		Number of tillers (per meter row length)
	30 DAS	At harvest	At Harvest
T_1 - Control	30.33	30.13	17.90
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	32.24	32.04	44.56
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	32.44	32.24	46.91
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	31.98	31.88	35.81
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	32.06	31.96	42.26
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	31.76	31.66	25.91
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	31.82	31.72	32.58
SEm (±)	0.28	0.32	1.95
CD (5%)	NS	NS	5.89

Table 3: Effect of fertilizer doses and foliar application of NPK on Finger millet (*Eleusie coracana* L. Gaertn) on Plant height (cm)

Treatments	Plant height (cm)			
	30 DAS	60 DAS	90 DAS	At harvest
T_1 - Control	24.41	53.9	95.78	91.78
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	45.52	82.33	132.01	128.01
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	45.75	85.86	136.53	132.53
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	38.21	72.6	118.25	114.92
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	38.43	80.5	129.80	125.80
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	32.25	62.96	108.30	104.07
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	33.33	68.8	116.13	112.63
SEm (±)	1.50	1.79	2.42	2.72
CD (5%)	4.52	5.54	7.49	8.40

Table 4: Effect of fertilizer doses and foliar application of NPK of Finger millet (*Eleusie coracana* L. Gaertn) on dry matter accumulation (g plant^{-1}) at 30, 60, 90 DAS and at harvest

Treatments	dry matter accumulation (g plant^{-1})			
	30 DAS	60 DAS	90 DAS	At harvest
T_1 - Control	3.03	7.25	16.34	21.10
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	6.88	18.15	36	41.36
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	7.02	19.30	37.43	43.76
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	5.86	15.06	30.06	34.25
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	5.73	17.51	34.03	39.66
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	4.33	11.35	24.40	27.28
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	4.73	14.09	28.59	32.00
SEm (±)	0.33	0.71	1.27	1.47
CD (5%)	1.02	2.21	3.92	4.54

Table 5: Panicle length (cm) and test weight of Finger millet (*Eleusie coracana* L. Gaertn) as influenced by fertilizer doses and foliar application of NPK

Treatments	Panicle length (cm)	Test weight (g)
T_1 - Control	4.94	2.54
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	11.57	3.63
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	12.24	3.74
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	9.05	3.26
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	10.8	3.56
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	7.05	2.87
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	8.63	3.18
SEm (±)	0.47	0.09
CD (5%)	1.46	0.28

Table 6: Grain yield (Kg ha^{-1}), straw yield (Kg ha^{-1}) and harvest index (%) of Finger millet (*Eleusie coracana* L. Gaertn) as influenced by fertilizer doses and foliar application of NPK

Treatments	Grain yield (Kg ha^{-1})	Straw yield (Kg ha^{-1})	Harvest index (%)
T_1 - Control	668.20	1465.72	31.22
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	2177.00	4077.52	34.80
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	2307.20	4225.05	35.30
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	1827.18	3620.04	33.54
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	2099.464	3954.317	34.70
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	1428.29	3025.81	31.95
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	1683.87	3353.72	33.44
SEm (±)	69.3	103.58	0.79
CD (5%)	213.94	318.34	NS

Table 7: Effect of fertilizer doses and foliar application of NPK on Finger Millet nitrogen,phosphorus and potassium content (%)

Treatments	Nutrient content (%)								
	N			P			K		
	Grain	Straw	Total	Grain	Straw	Total	Grain	Straw	Total
T_1 - Control	0.39	0.04	0.43	0.11	0.054	0.16	0.06	0.21	0.27
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	0.84	0.2	1.04	0.3	0.085	0.38	0.24	0.52	0.76
T_3 - 100% RDF + NPK Foliar spray (19: 19: 19) once (30 DAS)	0.87	0.23	1.1	0.32	0.089	0.40	0.26	0.53	0.79
T_4 - 75% RDF + NPK Foliar spray (19: 19: 19) once (30 DAS)	0.72	0.12	0.84	0.23	0.074	0.30	0.21	0.45	0.66
T_5 - 75% RDF + NPK Foliar spray (19: 19: 19) twice (30 and 50 DAS)	0.8	0.18	0.98	0.289	0.082	0.37	0.23	0.5	0.73
T_6 - 50% RDF + NPK Foliar spray (19: 19: 19) once (30 DAS)	0.49	0.08	0.57	0.14	0.065	0.20	0.13	0.39	0.52
T_7 - 50% RDF + NPK Foliar spray (19: 19: 19) twice (30 and 50 DAS)	0.68	0.1	0.78	0.21	0.068	0.27	0.15	0.47	0.62
SEm (±)	0.028	0.008	0.036	0.005	0.003	0.009	0.005	0.011	0.016
CD (5%)	0.08	0.024	0.10	0.015	0.009	0.027	0.015	0.03	0.04

Table 8: Effect of fertilizer doses and foliar application of NPK on Finger Millet nitrogen, phosphorus and potassium uptake (kg ha^{-1})

Treatments	Total Nutrient uptake (kg ha^{-1})		
	N	P	K
T_1 - Control	9.17	3.49	5.76
T_2 - 100% RDF (60:40:30 kg NPK ha^{-1})	65.42	24.07	47.53
T_3 - 100% RDF + NPK Foliar spray (19:19:19) once (30 DAS)	71.85	26.71	51.60
T_4 - 75% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	42.39	16.55	35.95
T_5 - 75% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	59.11	22.45	44.19
T_6 -50% RDF + NPK Foliar spray (19:19:19) once at (30 DAS)	26.27	9.13	23.16
T_7 – 50% RDF + NPK Foliar spray (19:19:19) twice at (30 and 50 DAS)	38.25	14.00	31.23
SEm (±)	4.39	1.48	2.50
CD (5%)	13.21	4.46	7.53

Conclusion

The results showed that growth parameters, viz. plant population, plant height, number of tillers, dry matter accumulation, CGR, RGR and yield attributes viz., panicle length, test weight was found to be higher under treatment T_3 (100% RDF + NPK foliar spray once at 30 DAS) followed closely by Treatment T_2 involving (100% RDF alone) and treatment T_5 involving (75% RDF + NPK foliar spray twice at 30 and 50 DAS). The yield parameters like grain yield and straw yield, recorded maximum grain yield (2307.20 Kg ha^{-1}) and straw yield (4225.05 Kg ha^{-1}) under T_3 it is at par with treatment T_2 (grain yield – 2177.00 Kg ha^{-1}) and (straw yield – 4077.52 Kg ha^{-1}) and T_5 (grain yield – 2099.46 Kg ha^{-1}) and (straw yield – 383954.31 Kg ha^{-1}). The economic parameters like gross monetary returns, net monetary returns and B:C ratio was significantly superior

under treatment T_3 highest gross return (1,23,292.45 ₹ ha^{-1}) was obtained with the application of 100% RDF + NPK foliar spray once at 30 DAS and this treatment also gave highest net return (86,040.45 ₹ ha^{-1}) and B:C ratio 3.30. However, lowest gross return (31160 ₹ ha^{-1}) lowest net return (5152.57 ₹ ha^{-1}) and lowest B:C ratio (1.16) was obtained under control (T_1).

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