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Standardizing seedling age and planting geometry for higher productivity and profitability of transplanted finger millet (*Eleusine coracana* L.) under Southern transition Zone of Karnataka

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Abstract

Standardizing crop establishment practices is essential for improving the productivity and profitability of finger millet under rainfed conditions. A field experiment was conducted during the *kharif* season of 2024 at the Agricultural and Horticultural Research Station, Honnavile, Karnataka, to evaluate the interactive effects of seedling age and planting geometry on yield attributes, productivity and economics of transplanted finger millet (*Eleusine coracana* L.). The experiment was laid out in a split-plot design with three replications, comprising three seedling ages (14, 21 and 28 days after transplanting) as main-plot treatments and five planting geometries (20 × 20, 25 × 25, 30 × 30, 35 × 35 and 30 × 10 cm) as sub-plot treatments. The results revealed that transplanting 28-day-old seedlings significantly improved yield attributes, grain yield and economic returns compared with 14 and 21-day-old seedlings. Among the planting geometries, wider spacing of 35 × 35 cm recorded the highest grain yield (2718.67 kg ha⁻¹), harvest index (0.39), net returns (Rs. 50,176.53 ha⁻¹) and benefit ratio (2.28). The interaction between 28-day-old seedlings and 35 × 35 cm spacing proved superior, recording the highest grain yield (3541 kg ha⁻¹), gross returns (Rs. 115,436.60 ha⁻¹), net returns (Rs. 71,701.60 ha⁻¹) and benefit ratio (2.64). The improved performance was attributed to enhanced crop establishment, better utilization of available resources and superior expression of yield attributes under wider spacing. The study demonstrated that transplanting 28-day-old seedlings at 35 × 35 cm spacing is an efficient and economically viable crop establishment strategy for maximizing productivity and profitability of transplanted finger millet.

Keywords: Finger millet, crop establishment, seedling age, planting geometry, grain yield, profitability, rainfed agriculture

1. Introduction

Finger millet (*Eleusine coracana*) is one of the most important nutri-cereals cultivated in the semi-arid tropics of Asia and Africa. In India, it is predominantly grown under rainfed conditions because of its remarkable adaptability to drought, poor soil fertility and erratic rainfall (Gebreyohannes *et al.*, 2024) [3]. Besides its resilience to climatic stresses, finger millet is recognized for its exceptional nutritional value owing to its high calcium, dietary fibre, essential amino acids and micronutrient contents, making it an important crop for ensuring nutritional security and climate-resilient agriculture. Recent reviews have also highlighted its increasing importance in sustainable food systems and crop diversification under changing climatic conditions (Wright and Devos, 2024) [15].

Finger millet productivity continues to remain below its attainable potential owing to several agronomic constraints, among which crop establishment is one of the most critical. Poor plant stand, inadequate tillering and inefficient utilization of water, nutrients, light and growing space collectively limit crop productivity and profitability (Hasanath *et al.*, 2025) [5]. Therefore, optimizing crop establishment through appropriate agronomic interventions is essential for improving resource-use efficiency and maximizing the productivity of finger millet.

Transplanting has emerged as an effective crop establishment technique in finger millet and forms an important component of improved cultivation practices. Proper transplanting promotes better root establishment, uniform crop stands, enhanced tillering, efficient

utilization of soil moisture and nutrients and improved crop vigour compared with conventional establishment methods (Chakravarthi *et al.*, 2024) ^[2]. However, the success of transplanting depends largely on the physiological stage of seedlings and the spatial arrangement of plants in the field (Rao, 2021) ^[11].

Seedling age plays a critical role in determining transplant establishment, root regeneration, tiller production and subsequent biomass accumulation. Likewise, planting geometry governs plant population density and regulates competition for light, water, nutrients and growing space. (Aliveni *et al.*, 2025) ^[1] Appropriate spacing improves canopy architecture, light interception, aeration and nutrient acquisition, thereby enhancing yield and economic returns, whereas either excessively close or excessively wide spacing may reduce overall productivity because of increased competition or underutilization of available land resources (Tamilmozhi *et al.*, 2022) ^[14].

Although several studies have demonstrated the beneficial effects of seedling age and planting geometry on the growth and productivity of transplanted finger millet, most investigations have evaluated these factors independently. Comprehensive information on their interactive effects on yield attributes, productivity and profitability remains limited. Furthermore, identifying an optimum combination of seedling age and planting geometry is essential for developing efficient crop establishment strategies that maximize resource-use efficiency, improve crop productivity and enhance economic returns. Therefore, the present investigation was undertaken to evaluate the interactive effects of different seedling ages and planting geometries on yield attributes, productivity and profitability of transplanted finger millet (*Eleusine coracana* L.).

2. Materials and Methods

2.1 Experimental site, soil and weather conditions

A field experiment was conducted during the *kharif* season of 2024 at the Agricultural and Horticultural Research Station (AHRs), Honnavale, Shivamogga, Karnataka, India, situated at 13.8459° N latitude and 75.4267° E longitude. The experiment was conducted using finger millet (*Eleusine coracana*) cultivar ML-365, a short to medium duration (105-110 days) variety characterized by drought tolerance and resistance to neck blast and most suitable for transplanting under irrigated tracts of Karnataka.

The experimental field comprised red sandy loam soil with a neutral to slightly alkaline reaction (pH 7.4), electrical conductivity (EC) of 0.24 dS m⁻¹ and organic carbon content of 0.47%, indicating non-saline soil with low to medium organic carbon status. The experiment was conducted under the humid tropical climatic conditions of the *Southern Transition Zone* of Karnataka.

Weather during the crop growth period was characterized by warm and humid conditions. The mean maximum temperature ranged from 28.55 to 29.60 °C, while the mean minimum temperature varied from 20.35 to 21.85 °C. Morning relative humidity ranged from 81.60 to 90.80%, whereas afternoon relative humidity varied between 69.75 and 73.95%. The experimental site received a total rainfall of 675 mm during the crop growth period, with the highest monthly rainfall recorded in August (294 mm), followed by October (172 mm) and September (162 mm). The monthly meteorological observations recorded during the experimental period are presented in Table 1.

Table 1: Monthly meteorological observations during the experimental period (*Kharif* 2024)

Month	Avg. Temperature (°C)		Avg. Relative Humidity (%)		Rainfall (mm)
	Max.	Min.	Forenoon	Afetrnoon	
June	31.8	21.45	82.35	61.90	102.0
July	26.10	20.75	91.70	82.00	259.0
August	29.58	20.55	90.80	71.10	294.0
September	29.60	20.35	89.95	73.95	162.0
October	29.30	21.85	83.75	71.40	172.0
November	28.55	21.80	81.60	69.75	47.0

2.2 Experimental design and treatments

The experiment was laid out in a split-plot design with three replications, assigning seedling age to the main plots and planting geometry to the subplots. The main plot treatments consisted of three seedling ages: 14 days (A₁), 21 days (A₂), and 28 days (A₃). The subplot treatments comprised five planting geometries: 20 × 20 cm (S₁), 25 × 25 cm (S₂), 30 × 30 cm (S₃), 35 × 35 cm (S₄), and 30 × 10 cm (S₅).

A recommended fertilizer dose of 40 kg N, 20 kg P₂O₅ and 20 kg K₂O ha was uniformly applied to all treatments in accordance with the recommended package of practices for finger millet cultivation. All intercultural operations, including weed management and plant protection measures, were carried out uniformly across the treatments to ensure optimum crop growth.

2.3 Statistical analysis

The experimental data were subjected to analysis of variance (ANOVA) appropriate for a split-plot design, considering establishment method as the main plot factor and crop geometry as the sub-plot factor. The significance of treatment effects was tested using the F-test at the 5% probability level. Whenever the treatment effects were found to be significant, the means were compared using the Critical Difference (CD) at *P* = 0.05, as described by Gomez and Gomez (1984) ^[4].

3. Results and Discussion

3.1 Yield attributes

Yield attributes of finger millet were significantly influenced by seedling age, planting geometry and their interaction, except for test weight, which remained unaffected by the treatments (Table 2). Among the establishment methods, transplanting 28-day-old seedlings (A₃) recorded significantly higher number of ear heads (84.12 m⁻²), ear head weight (6.97 g), number of fingers per ear head (4.79) and finger length (4.73 cm) than 14 and 21-day-old seedlings. Among the planting geometries, the closer spacing of 30 × 10 cm (S₅) produced the maximum number of ear heads (115.23 m⁻²), whereas the wider spacing of 35 × 35 cm (S₄) recorded significantly higher ear head weight (9.72 g), number of fingers per ear head (5.58) and finger length (5.34 cm).

The interaction between seedling age and planting geometry was significant for all yield attributes except test weight. Transplanting 28-day-old seedlings at 30 × 10 cm spacing (A₃S₅) produced the highest number of ear heads (131.00 m⁻²), while 28-day-old seedlings transplanted at 35 × 35 cm spacing (A₃S₄) recorded the highest ear head weight (9.72 g), number of fingers per ear head (6.12) and finger length (5.81 cm). Test weight did not differ significantly among the treatments, suggesting that grain size was primarily governed by varietal characteristics rather than crop establishment practices.

Table 2: Yield attributes of finger millet as influenced by methods of establishment crop geometry.

Treatment	Number of ear heads (m ⁻²)	Ear head weight (g)	Number of fingers ear head ⁻¹	Length of finger (cm)	Test weight (g)
Establishment method (A)					
A ₁ : Transplanting at 14 DAT	57.10	6.64	4.49	4.30	3.11
A ₂ : Transplanting at 21 DAT	72.15	6.85	4.76	4.53	3.10
A ₃ : Transplanting at 28 DAT	84.12	6.97	4.79	4.73	3.16
S.E.m±	0.19	0.00	0.00	0.00	0.00
CD (P = 0.05)	0.74	0.02	0.02	0.01	0.00
Crop geometry (S)					
S ₁ : 20 × 20 cm	60.10	2.95	4.10	3.93	2.95
S ₂ : 25 × 25 cm	64.01	6.16	4.21	4.03	3.11
S ₃ : 30 × 30 cm	71.48	7.60	4.50	4.79	3.24
S ₄ : 35 × 35 cm	44.79	9.72	5.58	5.34	3.30
S ₅ : 30 × 10 cm	115.23	7.64	5.00	4.51	3.03
S.E.m±	1.08	0.12	0.08	0.07	0.05
CD (P = 0.05)	3.14	0.35	0.22	0.21	0.14
Interaction (A × S)					
A ₁ S ₁ (14 DAT × 20 × 20 cm)	50.00	2.79	4.10	3.90	3.00
A ₁ S ₂ (14 DAT × 25 × 25 cm)	51.00	6.81	4.10	4.00	3.12
A ₁ S ₃ (14 DAT × 30 × 30 cm)	56.18	7.18	4.20	4.40	3.20
A ₁ S ₄ (14 DAT × 35 × 35 cm)	30.10	9.30	5.23	4.90	3.21
A ₁ S ₅ (14 DAT × 30 × 10 cm)	98.20	7.10	4.80	4.30	3.01
A ₂ S ₁ (21 DAT × 20 × 20 cm)	60.18	3.18	4.60	3.89	2.82
A ₂ S ₂ (21 DAT × 25 × 25 cm)	62.90	5.58	4.22	4.10	3.10
A ₂ S ₃ (21 DAT × 30 × 30 cm)	79.00	7.62	4.60	4.85	3.31
A ₂ S ₄ (21 DAT × 35 × 35 cm)	42.17	10.15	5.40	5.30	3.28
A ₂ S ₅ (21 DAT × 30 × 10 cm)	116.50	7.70	5.00	4.52	3.00
A ₃ S ₁ (28 DAT × 20 × 20 cm)	70.11	2.89	3.61	4.00	3.01
A ₃ S ₂ (28 DAT × 25 × 25 cm)	78.12	6.10	4.32	4.00	3.10
A ₃ S ₃ (28 DAT × 30 × 30 cm)	79.27	8.00	4.71	5.12	3.20
A ₃ S ₄ (28 DAT × 35 × 35 cm)	62.11	9.72	6.12	5.81	3.40
A ₃ S ₅ (28 DAT × 30 × 10 cm)	131.00	8.12	5.21	4.72	3.10
S.E.m±	1.86	0.21	0.13	0.12	0.09
CD (P = 0.05)	5.44	0.60	0.38	0.36	0.25

The superior yield attributes observed with 28-day-old seedlings are attributed to their physiological maturity and greater transplanting resilience, which enabled rapid establishment, early recovery from transplanting shock and sustained vegetative growth. Well-established seedlings developed a more extensive root system with greater soil exploration capacity, facilitating efficient absorption of water and nutrients and supporting higher photosynthetic activity. This, in turn, promoted greater dry matter production and efficient translocation of assimilates towards developing reproductive structures, resulting in larger ear heads with more fingers and longer fingers. In addition, the enhanced tillering ability and improved synchronization between vegetative and reproductive growth in older seedlings contributed to the production of productive tillers with superior sink capacity.

Planting geometry markedly influenced the balance between plant population and the availability of growth resources per plant. Wider spacing (35 × 35 cm) reduced intra-specific competition for light, moisture, nutrients and growing space, allowing better canopy development, greater light interception and improved photosynthetic efficiency. The increased availability of assimilates during the reproductive phase favored ear head enlargement and finger development, thereby improving individual plant

productivity. Conversely, the closer spacing (30 × 10 cm) accommodated a higher plant population, resulting in a greater number of ear heads per unit area despite comparatively smaller ear heads due to increased competition among neighboring plants. The significant interaction between seedling age and planting geometry indicates that physiologically vigorous 28-day-old seedlings were able to exploit the favorable microenvironment created under wider spacing more effectively, thereby maximizing the expression of yield attributes. Similar findings have been reported by Kumari *et al.* (2025) ^[6] and Niharika *et al.* (2021) ^[8].

3.2 Grain yield, straw yield and harvest index

Grain yield, straw yield and harvest index were significantly influenced by seedling age, planting geometry and their interaction (Table 3). Transplanting 28-day-old seedlings (A₃) produced significantly higher grain yield (3017.4 kg ha⁻¹), straw yield (4801.2 kg ha⁻¹) and harvest index (0.39), followed by 21-day-old seedlings (A₂), whereas the lowest values were recorded with 14-day-old seedlings (A₁). Among the planting geometries, wider spacing of 35 × 35 cm (S₄) recorded the highest grain yield (2718.67 kg ha⁻¹) and harvest index (0.39), while 30 × 30 cm spacing (S₃) produced the highest straw yield (4363.67 kg ha⁻¹).

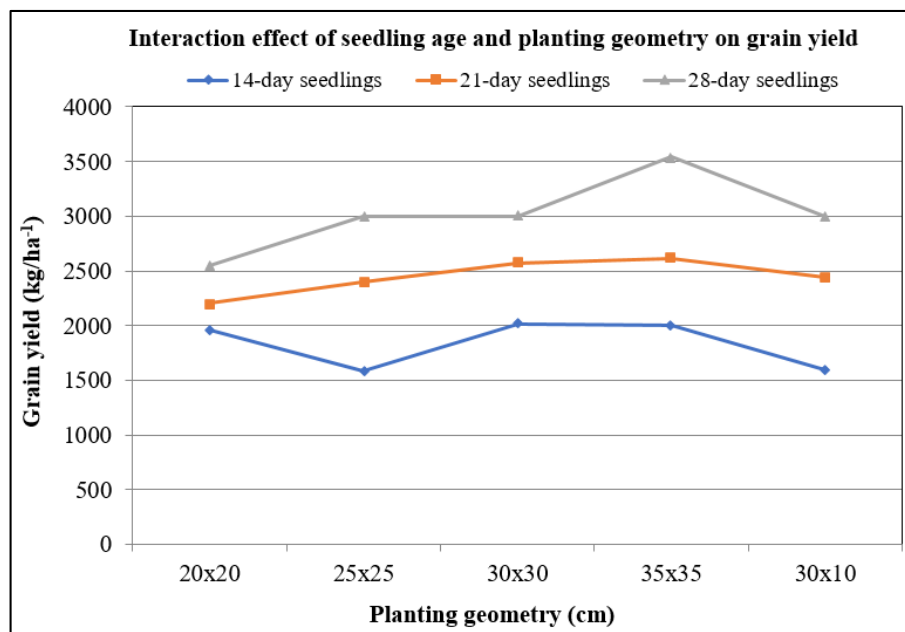


Fig 1: Interaction effect of seedling age and planting geometry on grain yield of finger millet under rainfed conditions.

The interaction effect of seedling age and planting geometry on grain yield is presented in Figure 1. Grain yield increased progressively with seedling age across all planting geometries, with 28-day-old seedlings consistently outperforming the younger seedlings. Among the treatment combinations, transplanting 28-day-old seedlings at 35 × 35 cm spacing (A₃S₄) recorded the highest grain yield (3541 kg

ha⁻¹), whereas the lowest grain yield was obtained with 14-day-old seedlings transplanted at 25 × 25 cm spacing (A₁S₂). The higher straw yield (4971 kg ha⁻¹) was recorded with 28-day-old seedlings transplanted at 25 × 25 cm spacing (A₃S₂), which was statistically comparable with 20 × 20 cm spacing (A₃S₁).

Table 3: Grain yield (kg ha⁻¹), Straw yield (kg ha⁻¹) and Harvest Index of finger millet as influenced by methods of establishment and crop geometry

Treatment	Grain yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	Harvest index
Establishment method (A)			
A ₁ : Transplanting at 14 DAT	1832.40	3554.60	0.34
A ₂ : Transplanting at 21 DAT	2446.40	4282.60	0.36
A ₃ : Transplanting at 28 DAT	3017.40	4801.20	0.39
S.E.m±	6.56	6.67	0.00
CD (P = 0.05)	25.75	26.19	0.00
Crop geometry (S)			
S ₁ : 20 × 20 cm	2235.33	4145.33	0.35
S ₂ : 25 × 25 cm	2328.00	4157.33	0.36
S ₃ : 30 × 30 cm	2531.00	4363.67	0.36
S ₄ : 35 × 35 cm	2718.67	4222.67	0.39
S ₅ : 30 × 10 cm	2347.33	4175.00	0.35
S.E.m±	39.57	67.16	0.01
CD (P = 0.05)	115.51	196.01	0.02
Interaction (A × S)			
A ₁ S ₁ (14 DAT × 20 × 20 cm)	1957.00	3230.00	0.38
A ₁ S ₂ (14 DAT × 25 × 25 cm)	1589.00	3241.00	0.33
A ₁ S ₃ (14 DAT × 30 × 30 cm)	2018.00	4041.00	0.33
A ₁ S ₄ (14 DAT × 35 × 35 cm)	1998.00	3330.00	0.38
A ₁ S ₅ (14 DAT × 30 × 10 cm)	1600.00	3931.00	0.29
A ₂ S ₁ (21 DAT × 20 × 20 cm)	2201.00	4255.00	0.34
A ₂ S ₂ (21 DAT × 25 × 25 cm)	2400.00	4260.00	0.36
A ₂ S ₃ (21 DAT × 30 × 30 cm)	2572.00	4373.00	0.37
A ₂ S ₄ (21 DAT × 35 × 35 cm)	2617.00	4400.00	0.37
A ₂ S ₅ (21 DAT × 30 × 10 cm)	2442.00	4125.00	0.37
A ₃ S ₁ (28 DAT × 20 × 20 cm)	2548.00	4951.00	0.34
A ₃ S ₂ (28 DAT × 25 × 25 cm)	2995.00	4971.00	0.38
A ₃ S ₃ (28 DAT × 30 × 30 cm)	3003.00	4677.00	0.39
A ₃ S ₄ (28 DAT × 35 × 35 cm)	3541.00	4938.00	0.42
A ₃ S ₅ (28 DAT × 30 × 10 cm)	3000.00	4469.00	0.40
S.E.m±	68.54	116.32	0.01
CD (P = 0.05)	200.07	339.50	0.03

The increase in grain yield with 28-day-old seedlings was associated with the significant improvement in yield attributes, particularly ear head weight, finger length and the number of fingers per ear head, which enhanced the reproductive sink capacity and ultimately increased grain production. The higher grain yield recorded under 35×35 cm spacing indicates that improved expression of individual yield components compensated for the relatively lower plant population. In contrast, the higher plant density under 30×10 cm spacing increased the number of ear heads per unit area. However, the comparatively lower ear head weight and fewer fingers per ear head restricted grain yield. The significantly higher harvest index recorded with 28-day-old seedlings transplanted at 35×35 cm spacing further suggests a greater proportion of biomass was partitioned towards grain production, resulting in improved yield realization. These results demonstrate that optimization of seedling age and planting geometry enhanced reproductive efficiency and yield formation in transplanted finger millet. Similar findings have been reported by Rao *et al.* (2021) [11], Prakash *et al.* (2021) [9], Nagaraj *et al.* (2025) [7] and Ramesh *et al.* (2019) [10].

Overall, the results demonstrate that transplanting 28-day-old seedlings at an optimum planting geometry improved

yield attributes, grain yield and harvest index by promoting better crop establishment, efficient resource utilization and enhanced assimilate partitioning under rainfed conditions.

3.3 Economics

The economics of finger millet cultivation was significantly influenced by seedling age, planting geometry and their interaction (Table 5). Among the establishment methods, transplanting 28-day-old seedlings (A_3) recorded significantly higher gross returns (Rs. 98,367.24 ha⁻¹), net returns (Rs. 54,632.24 ha⁻¹) and B:C ratio (2.25), followed by 21-day-old seedlings (A_2), while the lowest economic returns were obtained with 14-day-old seedlings (A_1). Similarly, planting geometry significantly affected profitability, with the wider spacing of 35×35 cm (S_4) registering the highest gross returns (Rs. 88,628.53 ha⁻¹), net returns (Rs. 50,176.53 ha⁻¹) and B:C ratio (2.28). The interaction effect was also significant, wherein transplanting 28-day-old seedlings at 35×35 cm spacing (A_3S_4) produced the maximum gross returns (Rs. 115,436.60 ha⁻¹), net returns (Rs. 71,701.60 ha⁻¹) and B:C ratio (2.64), whereas the lowest economic returns were recorded with 14-day-old seedlings transplanted at 20×20 cm spacing (A_1S_1).

Table 4: Economics of finger millet as influenced by methods of establishment and crop geometry

Treatment	Gross returns (Rs. ha ⁻¹)	Net returns (Rs. ha ⁻¹)	B:C ratio
Establishment method (A)			
A ₁ : Transplanting at 14 DAT	59736.24	24851.24	1.71
A ₂ : Transplanting at 21 DAT	79752.64	43016.64	2.17
A ₃ : Transplanting at 28 DAT	98367.24	54632.24	2.25
S.E.m±	306.70	257.06	0.01
CD (P = 0.05)	1204.26	1009.34	0.02
Crop geometry (S)			
S ₁ : 20 × 20 cm	72871.87	34419.87	1.89
S ₂ : 25 × 25 cm	75892.80	37440.80	1.95
S ₃ : 30 × 30 cm	82510.60	44058.60	2.14
S ₄ : 35 × 35 cm	88628.53	50176.53	2.28
S ₅ : 30 × 10 cm	76523.07	38071.07	1.97
S.E.m±	1275.97	676.70	0.03
CD (P = 0.05)	3724.29	1975.16	0.09
Interaction (A × S)			
A ₁ S ₁ (14 DAT × 20 × 20 cm)	63798.20	28913.20	1.83
A ₁ S ₂ (14 DAT × 25 × 25 cm)	51801.40	16916.40	1.48
A ₁ S ₃ (14 DAT × 30 × 30 cm)	65786.80	30901.80	1.89
A ₁ S ₄ (14 DAT × 35 × 35 cm)	65134.80	30249.80	1.87
A ₁ S ₅ (14 DAT × 30 × 10 cm)	52160.00	17275.00	1.50
A ₂ S ₁ (21 DAT × 20 × 20 cm)	71752.60	35016.60	1.95
A ₂ S ₂ (21 DAT × 25 × 25 cm)	78240.00	41504.00	2.13
A ₂ S ₃ (21 DAT × 30 × 30 cm)	83847.20	47111.20	2.28
A ₂ S ₄ (21 DAT × 35 × 35 cm)	85314.20	48578.20	2.32
A ₂ S ₅ (21 DAT × 30 × 10 cm)	79609.20	42873.20	2.17
A ₃ S ₁ (28 DAT × 20 × 20 cm)	83064.80	39329.80	1.90
A ₃ S ₂ (28 DAT × 25 × 25 cm)	97637.00	53902.00	2.23
A ₃ S ₃ (28 DAT × 30 × 30 cm)	97897.80	54162.80	2.24
A ₃ S ₄ (28 DAT × 35 × 35 cm)	115436.60	71701.60	2.64
A ₃ S ₅ (28 DAT × 30 × 10 cm)	97800.00	54065.00	2.24
S.E.m±	2210.04	1172.09	0.06
CD (P = 0.05)	6450.66	3421.07	0.16

The higher economic returns obtained with 28-day-old seedlings transplanted at 35×35 cm spacing were primarily a consequence of their superior grain yield and enhanced yield attributes, which substantially increased gross income without a proportional increase in cultivation costs. The improved net returns and B:C ratio indicate that the

additional investment associated with optimum crop establishment was effectively compensated by higher productivity. Although closer spacing increased plant population, the resulting reduction in the performance of individual plants adversely affected economic returns. In contrast, wider spacing facilitated better

crop growth and efficient utilization of available resources, resulting in higher productivity and greater profitability. The significantly higher B:C ratio observed under the combination of 28-day-old seedlings and 35 × 35 cm spacing demonstrate the economic advantage of adopting an optimum crop establishment strategy under rainfed conditions. These findings suggest that appropriate manipulation of seedling age and planting geometry can enhance both productivity and profitability by improving resource-use efficiency and maximizing economic returns. Similar observations have been reported by Sharma *et al.* (2025) ^[12] and Shiva Kumar *et al.*, (2022) ^[13].

4. Conclusion

The present investigation demonstrated that seedling age and planting geometry significantly influenced the productivity and profitability of transplanted finger millet under rainfed conditions. Transplanting 28-day-old seedlings markedly improved yield attributes, grain yield, nutrient uptake and economic returns compared with younger seedlings. Among the planting geometries, wider spacing (35 × 35 cm) provided a favourable crop environment by reducing inter-plant competition and improving the utilization of available resources, resulting in superior productivity and profitability. The interaction of 28-day-old seedlings with 35 × 35 cm spacing proved to be the most effective crop establishment strategy, recording the highest grain yield (3541 kg ha⁻¹), nutrient uptake, gross returns (Rs. 115,436.60 ha⁻¹), net returns (Rs. 71,701.60 ha⁻¹) and benefit ratio (2.64). Therefore, transplanting 28-day-old seedlings at a spacing of 35 × 35 cm may be considered an efficient and economically viable crop establishment strategy for transplanted finger millet.

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