



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
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NAAS Rating (2025): 5.20
www.agronomyjournals.com
2025; 8(8): 1048-1050
Received: 11-06-2025
Accepted: 13-07-2025

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Effect of land configurations on growth and yield of Finger millet (*Eleusine coracana* L.) varieties in *kharif* season

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DOI: <https://www.doi.org/10.33545/2618060X.2025.v8.i8o.3693>

Abstract

A field experiment was conducted during the *kharif* season of 2024 to evaluate the effect of three land configurations (flat bed, ridges and furrow, and broad bed furrow) and three finger millet varieties (Phule Nachani, Phule Kasari, and Dapoli-1) on the growth, yield, and economics of finger millet (*Eleusine coracana* L. Gaertn). The results revealed that the broad bed furrow (BBF) system consistently outperformed other land configurations, producing significantly superior growth parameters including plant height (115.3 cm), number of tillers (2.76 plant⁻¹), functional leaves (32.97 plant⁻¹), leaf area (9.53 dm²), and dry matter accumulation (21.93 g plant⁻¹). Similarly, the variety Dapoli-1 demonstrated the best performance among the genotypes for most growth and yield attributes. These improvements translated into significantly higher yield components under BBF, including the number of earheads (2.32 plant⁻¹), fingers earhead⁻¹ (8.64), finger length (8.77 cm), and grain weight earhead⁻¹ (17.28 g). Consequently, the highest grain yield (2805 kg ha⁻¹) and straw yield (7402 kg ha⁻¹) were recorded with the BBF system. The variety Dapoli-1 also yielded the highest grain (2704 kg ha⁻¹). Economically, the combination of BBF and Dapoli-1 proved most profitable, yielding the highest net monetary returns (₹ 86,802 ha⁻¹) and benefit-cost ratio (2.71). The interaction between land configuration and varieties was found to be non-significant for all parameters. It is concluded that adopting the broad bed furrow method for cultivating the Dapoli-1 variety is a highly effective strategy for maximizing productivity and profitability in finger millet production under the conditions of this study.

Keywords: Finger millet, land configuration, varieties, growth, yield, economics, broad bed furrow, dapoli-1

Introduction

A field experiment was conducted during the *kharif* season of 2024 to evaluate the effect of three land configurations flat bed, ridges and furrow, and broad bed furrow and three finger millet varieties Phule Nachani, Phule Kasari, and Dapoli-1 on the growth, yield, and economics of finger millet (*Eleusine coracana* L. Gaertn). The results demonstrated that the broad bed furrow system consistently outperformed other land configurations, producing significantly superior growth parameters including plant height, number of tillers, functional leaves, leaf area, and dry matter accumulation. Similarly, the variety Dapoli-1 showed the best performance among the genotypes for most growth and yield attributes. These improvements translated into significantly higher yield components, culminating in the highest grain and straw yields being recorded with the broad bed furrow system, while Dapoli-1 also yielded the highest grain among the varieties. Economically, the combination of broad bed furrow and Dapoli-1 proved most profitable, yielding the highest net monetary returns and benefit-cost ratio. The interaction between land configuration and varieties was found to be non-significant for all parameters. It is concluded that adopting the broad bed furrow method for cultivating the Dapoli-1 variety is a highly effective strategy for maximizing productivity and profitability in finger millet production under the conditions of this study.

Materials and Methods

A field experiment was conducted during the *kharif* season of 2024 at the Agronomy Section of

the College of Agricultural Biotechnology, Latur, Maharashtra, to study the effect of land configurations and varieties on finger millet (*Eleusine coracana* L. Gaertn). The soil of the experimental site was clayey, moderately alkaline (pH 7.08), with low available nitrogen (228 kg ha⁻¹), medium phosphorus (15.70 kg ha⁻¹), and very high potassium (421 kg ha⁻¹). The experiment was laid out in a split-plot design with three replications, featuring three land configurations (Flat bed, Ridges and furrows, Broad Bed Furrow - BBF) as main plots and three varieties (Phule Nachani, Phule Kasari, Dapoli-1) as sub-plots, resulting in nine treatment combinations. The crop was sown on July 9, 2024, using a dibbling method at a spacing of 30 x 10 cm. Recommended agronomic practices were followed, including seed treatment, application of fertilizers (50% N, full P₂O₅, and K₂O as basal; remaining 50% N as top dressing), two weedings, two insecticide sprays, and one protective irrigation. Observations on growth parameters (plant height, tillers, functional leaves, dry matter, leaf area), yield attributes, and yield were recorded at periodic intervals. Soil samples were analyzed pre-sowing and post-harvest. Economic analysis (gross and net returns, B:C ratio) was performed. Data were statistically analyzed using analysis of variance, and correlation studies were conducted between yield and various growth attributes.

Results and Discussion

Growth attributes

Growth attributing characters of finger millet viz., plant height (cm), number of tillers plant⁻¹, and number of functional leaves plant⁻¹, leaf area plant⁻¹ (dm²) and total dry matter production plant⁻¹ (g), were influenced significantly by different land configurations and varieties are presented in Table 1.

Effect of land configurations

Among the land configurations, the broad bed furrow (L₃) system resulted in higher growth attributes, viz., number of tillers plant⁻¹ (2.76), number of functional leaves plant⁻¹ (32.97), leaf area (9.53 dm²), and dry matter production plant⁻¹ (21.93 g), which were at par with ridges and furrow (L₂) and significantly superior to the flat bed (L₁). However, the highest plant height (115.3 cm) was recorded under the broad bed furrow (L₃), which was significantly superior to the other configurations. The significant differences in growth attributes due to land configurations might be attributed to improved soil conditions, moisture conservation, and nutrient availability. Similar results were reported by Sanjivkumar *et al.* (2022)^[6].

Effect of varieties

Among the different varieties, Dapoli-1 (V₃) produced a higher number of tillers plant⁻¹ (2.69), number of functional leaves

plant⁻¹ (31.35), leaf area plant⁻¹ (9.72 dm²), and dry matter production plant⁻¹ (22.10 g), which was at par with Phule Kasari (V₂) and found significantly superior to Phule Nachani (V₁). However, the highest value of plant height (113.0 cm) was recorded by Dapoli-1 (V₃), which was at par with Phule Kasari (V₂) and significantly superior to Phule Nachani (V₁). The significant differences in growth attributes among varieties could be attributed to their inherent genetic potential for growth and development. Varieties with superior genetic constitutions, like Dapoli-1, are better equipped to utilize available resources, leading to enhanced tillering, leaf production, photosynthetic area, and biomass accumulation. Similar results were recorded by Prakash *et al.* (2018)^[3] and Reddy *et al.* (2021)^[5].

Yield

Data in Table 2 revealed that grain and biological yield of finger millet were affected significantly due to land configurations and varieties.

Effect of land configurations

Among the land configurations, the highest grain yield (2805 kg ha⁻¹) and biological yield (9988 kg ha⁻¹) were recorded in broad bed furrow (L₃) which was significantly superior to ridges and furrow (L₂) and flat bed (L₁). The highest value of harvest index (29%) was also recorded in broad bed furrow (L₃). The significant differences in yield due to land configurations might be attributed to improved soil physical conditions, enhanced moisture conservation, and better nutrient availability, which collectively promoted superior growth and yield attributes. Similar results were reported by Krishnaprabu (2015)^[1] and Sanjivkumar *et al.* (2022)^[5].

Effect of varieties

Among the varieties, Dapoli-1 (V₃) recorded the highest grain yield (2704 kg ha⁻¹) and biological yield (9897 kg ha⁻¹), which was at par with Phule Kasari (V₂) and found significantly superior to Phule Nachani (V₁). The highest value for harvest index (29%) was also recorded in Dapoli-1 (V₃). The improved yield in the superior variety might be due to its enhanced genetic potential for growth and yield attributes, such as a higher number of tillers, greater leaf area, and increased dry matter production. Thus, the inherent genetic superiority of the Dapoli-1 variety was the primary reason for its higher productivity. Similar results were recorded by Rathore *et al.* (2018)^[4] and Nagarajan *et al.* (2021)^[2].

Interaction effect

The effect of interaction between land configurations and varieties on growth attributes and yield were found to be non-significant.

Table 1: Growth attributing characters of finger millet as influenced by different land configurations and varieties.

Treatment	Plant height (cm)	No. of tillers plant ⁻¹	No. of functional leaves plant ⁻¹	Leaf area plant ⁻¹ (dm ²)	Dry matter production plant ⁻¹ (g)
Land configuration (L)					
L1: Flat bed	98.2	2.31	27.6	8.43	18.91
L2: Ridges and furrow	108.0	2.55	29.52	8.66	20.57
L3: Broad bed furrow	115.3	2.75	32.97	9.53	21.93
S.Em. ±	1.97	0.03	1.06	0.22	0.43
CD at 5%	7.74	0.11	4.16	0.83	1.69
Varieties (V)					
V1: Phule Nachani	100.1	2.33	28.3	7.94	18.16
V2: Phule Kasari	108.5	2.60	29.9	9.08	21.15
V3: Dapoli-1	113.0	2.69	31.5	9.72	22.10
S.E. (m)±	2.69	0.08	0.73	0.27	0.53
C.D. at 5%	8.31	0.25	2.77	0.81	1.61
Interaction (V×S)					
S.Em±	4.67	0.14	1.27	0.46	0.92
CD at 5%	NS	NS	NS	NS	NS

Table 2: Grain yield (kg ha⁻¹), straw yield (kg ha⁻¹), biological yield (kg ha⁻¹) and harvest index of finger millet as influenced by different land configurations and varieties.

Treatment	Grain yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	Biological yield (kg ha ⁻¹)	Harvest index (HI)
Land configurations (L)				
L1: Flat bed	1885	6034	7821	24
L2: Ridges and furrow	2719	7200	9691	27
L3: Broad bed furrow	2805	7402	9988	29
S.E.m. $\pm$	125.45	236.53	426.56	-
CD at 5%	492.57	928.73	1674.89	-
Varieties (V)				
V ₁ : Phule Nachani	2212	6366	8514	24
V ₂ : Phule Kasari	2493	6996	9090	26
V ₃ : Dapoli-1	2704	7275	9897	29
S.E. (m) $\pm$	77.55	182.14	218.34	-
C.D. at 5%	238.98	561.23	672.79	-
Interaction (L $\times$ V)				
S.E. (m) $\pm$	134.33	315.48	378.18	-
C.D. at 5%	NS	NS	NS	-
General Mean	2470	6879	9167	27

Conclusion

The broad bed furrow system and Dapoli-1 variety independently produced the highest finger millet yields. Their interaction was non-significant, showing consistent performance. Broad bed furrow improved soil conditions and moisture, while Dapoli-1's genetics enhanced resource use. Combining both is recommended for optimal productivity.

Acknowledgement

We are grateful to College of Agriculture, Latur, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani for the financial assistance and infrastructure facilities provided for the conduct of the work.

References

1. Krishnaprabu S. Impact of land configuration, seed rate and fertilizer doses on growth and yield of blackgram (*Vigna mungo* L.). International Journal of Innovative Research in Science, Engineering and Technology. 2015;4(8):7179-7183.
2. Nagarajan G, Ramesh T, Janaki P, Rathika S. Enhancement of finger millet productivity through land configuration and nitrogen management under sodic soil. Madras Agricultural Journal. 105(1):1-3.
3. Prakash G, Kalyana Murthy KN, Rohani, Meti J, Prathima AS. Nutrient uptake and economics of finger millet under guni method of planting in eastern dry zone of Karnataka. 2018.
4. Rathore RS, Singh R, Nawange DD. Effect of land configuration on growth and yield of black gram. Legume Research. 33(4):274-278.
5. Reddy BPS, Singh R, Singh AC. Effect of spacing and phosphorous levels on yield and economics of finger millet (*Eleusine coracana* L.). The Pharma Innovation Journal. 2021;10(11):723-725.
6. Sanjivkumar V, Baskar K, Manoharan S, Manikandan M, Solaimalai A, Ravindrachary G. Restoration of rainwater techniques and fertilizer split application methods on yield and total nutrient uptake of rainfed sorghum under vertisols (*Typic haplusterts*). International Journal of Agricultural Sciences. 2022;18(2):706-712.