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Growth and Yield Response of Groundnut (*Arachis hypogaea* L.) to different Land Configurations and Planting Geometry

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Abstract

A field experiment was conducted at Integrated Farming System demonstration plot (L-block), ZARS, UAS, GKVK, Bengaluru during *kharif* 2022 and 2023 seasons to study the performance of groundnut genotypes to land configuration and planting geometry. The experiment was laid out in a Randomized Complete Block Design consisting of eight treatments: Normal method + Kadiri Lepakshi + 30 cm x 10 cm (T_1), Normal method + Kadiri Lepakshi + 30 cm x 15 cm (T_2), Normal method + K-6 + 30 cm x 10 cm (T_3), Normal method + K-6 + 30 cm x 15 cm (T_4), Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (T_5), Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (T_6), Raised bed + K-6 + 30 cm x 10 cm (T_7), Raised bed + K-6 + 30 cm x 15 cm (T_8) and each treatment replicated thrice. The results demonstrated that significantly higher growth parameters, such as the number of branches per plant (13.23), leaf area (1421 cm² per plant) and dry matter production (54.70 g plant^{-1}) at 90 DAS, were observed with Raised bed + Kadiri Lepakshi + 30 cm x 15 cm spacing (T_6). Meanwhile, the higher plant height at 90 DAS (48.92 cm) was achieved with the Raised bed + K-6 + 30 cm x 10 cm (T_7) treatment. In terms of yield attributes, the Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (T_6) treatment resulted in significantly higher number of pods per plant (63), filled pods per plant (53), pod yield (2471 kg ha^{-1}) and kernel yield (1733 kg ha^{-1}). However, the harvest index was found to be non significant across treatments.

Keywords : Kadiri Lepakshi, Raised bed, Yield, Planting geometric

Groundnut (*Arachis hypogaea* L.) is an important oilseed crop in India. The botanical name of groundnut, *Arachis hypogaea* L. is derived from Greek words '*Arachis*' meaning a legume and '*hypogaea*' meaning below ground, referring to the formation of pods in the soil. Groundnut is called the king of oilseeds, it is also called wonder nut and poor men's cashew nut. Groundnut is a valuable source of vegetable fats and protein and is also commonly used as cattle feed and concentrated organic fertilizer. Regarding its consumption, around 10 per cent is used for food, 15 per cent for seed and 75 per cent for oil extraction. While its primary use is for oil production, groundnut is also directly consumed due to its high nutritional value.

India has the largest area under groundnut cultivation (5.42 million ha) and second largest producer (10.2 m t) in the world. The average productivity in India is 1716 kg ha^{-1}. In India, groundnut is predominantly grown in the states of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Madhya Pradesh, Uttar Pradesh, Rajasthan, Punjab and Odisha. Among these, Karnataka ranks first in terms of area under cultivation with 1.65 lakh hectares, followed by Odisha (1.10 lakh ha), Tamil Nadu

(0.94 lakh ha), Telangana (0.93 lakh ha) and Andhra Pradesh (0.81 lakh ha) (Anonymous, 2022). As compared to other states, the productivity of groundnut in Karnataka is low. Several factors contribute to low and unstable yield of groundnut, which includes lack of improved varieties, poor soil fertility and failure to adopt proper agronomic practices. These issues are further affected by environmental factors such as biotic and abiotic stresses (Singh and Joshi, 1993). Low yields have also been attributed to improper agronomic techniques, including limited technological knowledge (Variath and Janila, 2017). Two-thirds of the global production occurs in rainfed regions of the semi-arid tropics where rainfall is generally erratic and insufficient, causing unpredictable drought stress, the most important constraint for groundnut production (Kumar *et al.,* 2020). The scientific method of groundnut cultivation, incorporating high-yielding varieties and modern technologies has led to a 53 per cent increase in yield compared to traditional farming methods. Effective sowing techniques and superior genotypes are crucial for maximizing groundnut productivity (Natarajan *et al.,* 2024).

Since, the groundnut pods develop from underground, a loose, well aerated seed bed is essential because it allows pegs to pass through and promotes pod growth. Therefore, crop establishment, rooting pattern, soil porosity, moisture extraction pattern and pod yield may be impacted by the layout of the land at the time of sowing. Hence, it is important to choose the appropriate method of sowing and optimum spacing to ensure better light interception from the beginning of crop growth. Furthermore, groundnut productivity is largely dependent on the plant population per unit area. Keeping these points in view, a field experiment was conducted to find out the influence of land configuration and planting geometry on growth and yield of groundnut.

Material and Methods

A field experiment on effect of land configuration and planting geometry on growth and yield of groundnut (*Arachis hypogaea* L.) was conducted during *kharif* 2022 and 2023 at Integrated Farming System demonstration block (L-block), Zonal Agricultural Research Station, UAS, GKVK, Bengaluru located in the Eastern Dry Zone of Karnataka (Zone-5), situated at 13°08 N Latitude and 77°58 E Longitude, with an altitude of 930 meters above mean sea level. The actual rainfall received throughout the cropping period at the experimental site 864 mm and 557 mm during 2022 and 2023, respectively. The soil of the experimental site is red sandy loam with coarse sand (32.54%), fine sand (31.83%), silt (6.23%) and clay (29.40%) as soil components. The soil reaction was 6.45 with an EC of 0.24 dS m^{-1}, low in available nitrogen (270 kg ha^{-1}), medium in available phosphorus (51 kg ha^{-1}) and available potassium (204 kg ha^{-1}). The experiment consisted of eight treatments laid out in a Randomized Complete Block Design and replicated three times. The treatments were T_1: Normal method + Kadiri Lepakshi + 30 cm x 10 cm, T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm, T_3: Normal method + K-6 + 30 cm x 10 cm, T_4: Normal method + K-6 + 30 cm x 15 cm, T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm, , T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm, T_7: Raised bed + K-6 + 30 cm x 10 cm, and T_8: Raised bed + K-6 + 30 cm x 15 cm. The treatments were allotted randomly to each replication. The gross plot size was 3.0 m x 3.6 m and net plot size was 1.8 m x 3.0 m. The recommended fertilizer dose was 25:50:25 kg of N, P_2O_5 and K_2O per hectare, applied through urea, DAP and MOP. Additionally, $ZnSO_4$ at 10 kg ha^{-1} and borax at 10 kg ha^{-1} were incorporated. After 35 days after sowing (DAS), gypsum was applied at a rate of 500 kg ha^{-1} across all treatments, followed by manual earthing up.

Five plants were randomly selected and tagged from the net plot in each treatment. These plants were used to record observations on growth and yield attributes. The data recorded on various parameters were subjected to Fisher's method of analysis of variance and interpretation of the data was made as given by Gomez and Gomez (1984). The level of significance used in 'F' and 't' test was P = 0.05. Whenever, F-test was significant for comparison amongst the treatments means the critical differences (CD) was worked out. Otherwise against CD values abbreviation 'NS' (Non-significant) is indicated.

RESULTS AND DISCUSSION

Plant Height

An appraisal of data given in Table 1 indicates the effect of land configuration, variety and spacing on mean plant height of groundnut found to be significant at all growth stages. Plant height increased with an increase in the age of the crop up to maturity in all treatments.

The rate of increase in plant height was found to be faster from 30 to 60 days and relatively slow during subsequent stages up to maturity.

Among the different treatment combinations, Raised bed + K-6 + 30 cm x 10 cm (T_7) recorded significantly higher plant height at 30, 60, 90 DAS and at harvest (12.97, 34.25, 48.92 and 49.06 cm, respectively) and this was found on par with T_8: Raised bed + K-6 + 30 cm x 15 cm (12.48, 33.74, 48.28 and 47.48 cm, respectively). This might be due to the genetic character of K-6 cultivar, also raised bed helps better root development and root nodulation which directly influenced plant height. Similar results were obtained by Baskaran *et al.* (2003). Also, due to loose and porous nature of soil, favourable physical environment in the root zone resulting in absorption of more water and nutrients in raised bed resulted in better plant growth characteristics. Similar observations have also been reported by Patil *et al.* (2007) and Pachpor (2017). Increase in plant height with decrease in spacing might be observed due to increased competition for light at higher plant densities. The results are in accordance with the findings of Parameshwarareddy *et al.* (2019) and Walia *et al.* (2021).

Branches per Plant

The data regarding the effect of land configuration, variety and spacing on number of branches per plant is presented in Table 2.

At 30 DAS, growing of Kadiri Lepakshi groundnut in raised bed method of land configuration by

TABLE 1

Plant height (cm) of groundnut at different growth stages as influenced by method of sowing, variety and spacing

Treatments	30 DAS			60 DAS			90 DAS			At harvest		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
T_1:Normal method +Kadiri Lepakshi +30cm x 10 cm	9.97	9.22	9.60	20.70	19.19	19.94	28.72	26.83	27.78	28.45	27.67	28.06
T_2: Normal method + Kadiri Lepakshi + 30cm x 15 cm	10.60	9.00	9.80	21.20	19.44	20.32	28.75	28.57	28.66	30.07	29.67	29.87
T_3: Normal method + K-6 + 30cm x 10 cm	13.80	11.79	12.79	33.28	32.76	33.02	48.56	46.80	47.68	48.67	46.60	47.63
T_4: Normal method + K-6 + 30cm x 15 cm	12.23	11.83	12.03	32.67	32.44	32.56	47.63	45.37	46.50	47.12	45.13	46.12
T_5: Raised bed + Kadiri Lepakshi + 30cm x 10 cm	10.75	9.34	10.05	22.23	20.40	21.32	29.44	27.00	28.22	30.83	30.93	30.88
T_6: Raised bed + Kadiri Lepakshi + 30cm x 15 cm	11.78	9.77	10.77	23.44	21.14	22.29	31.50	29.22	30.36	31.11	32.25	31.68
T_7: Raised bed + K-6 + 30cm x 10 cm	13.60	12.34	12.97	34.33	34.17	34.25	49.00	48.84	48.92	49.78	48.33	49.06
T_8: Raised bed + K-6 + 30cm x 15 cm	13.17	11.79	12.48	33.66	33.83	33.74	48.89	47.67	48.28	47.63	47.33	47.48
S. Em. ±	0.47	0.50	0.41	1.17	1.36	0.86	1.66	1.68	1.51	1.68	1.53	1.46
C. D. at 5%	1.44	1.52	1.46	3.57	4.13	2.61	5.04	5.12	4.59	5.12	4.65	4.43

TABLE 2

Number of branches of groundnut at different growth stages as influenced by method of sowing, variety and spacing

Treatments	30 DAS			60 DAS			90 DAS			At harvest		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
T_1: Normal method + Kadiri Lepakshi +30cm x 10 cm	5.05	5.40	5.22	9.54	9.49	9.51	11.93	10.90	11.42	11.44	10.97	11.20
T_2: Normal method + Kadiri Lepakshi + 30cm x 15 cm	5.20	4.97	5.08	9.92	9.59	9.76	11.83	11.57	11.70	12.81	11.52	12.17
T_3: Normal method + K-6 + 30cm x 10 cm	3.86	4.20	4.03	4.43	5.33	4.88	7.67	6.00	6.83	7.30	5.30	6.30
T_4: Normal method + K-6 + 30cm x 15 cm	3.71	4.56	4.13	5.32	5.23	5.28	6.83	5.77	6.30	6.84	6.22	6.53
T_5: Raised bed + Kadiri Lepakshi + 30cm x 10 cm	5.10	5.83	5.47	10.73	9.93	10.33	12.95	11.79	12.37	13.37	13.35	13.36
T_6: Raised bed + Kadiri Lepakshi + 30cm x 15 cm	5.50	5.07	5.28	11.85	11.02	11.43	14.51	11.95	13.23	14.11	14.31	14.21
T_7: Raised bed + K-6 + 30cm x 10 cm	4.68	5.47	5.07	7.11	6.00	6.56	8.17	6.34	7.26	8.30	6.90	7.60
T_8: Raised bed + K-6 + 30cm x 15 cm	3.83	5.11	4.47	6.67	5.67	6.17	7.72	5.78	6.75	7.42	5.80	6.61
S. Em. ±	0.25	0.28	0.26	0.49	0.43	0.42	0.43	0.50	0.46	0.37	0.38	0.35
C. D. at 5%	0.78	0.87	0.79	1.49	1.32	1.28	1.32	1.51	1.39	1.13	1.15	1.08

following the spacing of 30 cm x 10 cm (T_5) recorded significantly higher number of branches per plant (5.47) and was found on par with all other treatments except T_3: Normal method + K-6 + 30 cm x 10 cm (4.03), T_4: Normal method + K-6 + 30 cm x 15 cm (4.13) and T_8: Raised bed + K-6 + 30 cm x 15 cm (4.47). Whereas, significantly higher number of branches per plant at 60, 90 DAS and at harvest were recorded with the T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (11.43, 13.23 and 14.21, respectively) and found on par with T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (10.33, 12.37 and 13.36, respectively). The number of primary branches increased when sowing was done in raised bed method as compared to normal sowing method. This method likely creates a favourable environmental condition for enhanced plant growth. These findings are consistent with the results reported by Patil *et al.* (2007) and Dikey *et al.* (2013). The genetic character of Kadiri Lepakshi resulted in production of greater number of branches per plant.

Leaf Area and Leaf Area Index

The data on mean leaf area (cm^2 per plant) as influenced by various treatments at different crop growth stages is presented in Fig. 1. It is generally accepted that the leaf area represents a measure of photosynthetic efficiency. The data revealed that the leaf area per plant increased with the advancement in the age of the crop up to 90 DAS and rate of increase decreased at harvest.

Leaf area was significantly affected by treatment combinations at all the stages of crop growth. At 30 and 60 DAS, significantly higher leaf area per plant was observed in T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (275 and 969 cm^2 $plant^{-1}$, respectively) and was found on par with T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (267 and 970 cm^2 $plant^{-1}$, respectively). At 90 DAS and at harvest, significantly higher leaf area was found with T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (1421 and 1191 cm^2 $plant^{-1}$) which is superior to all over the treatments

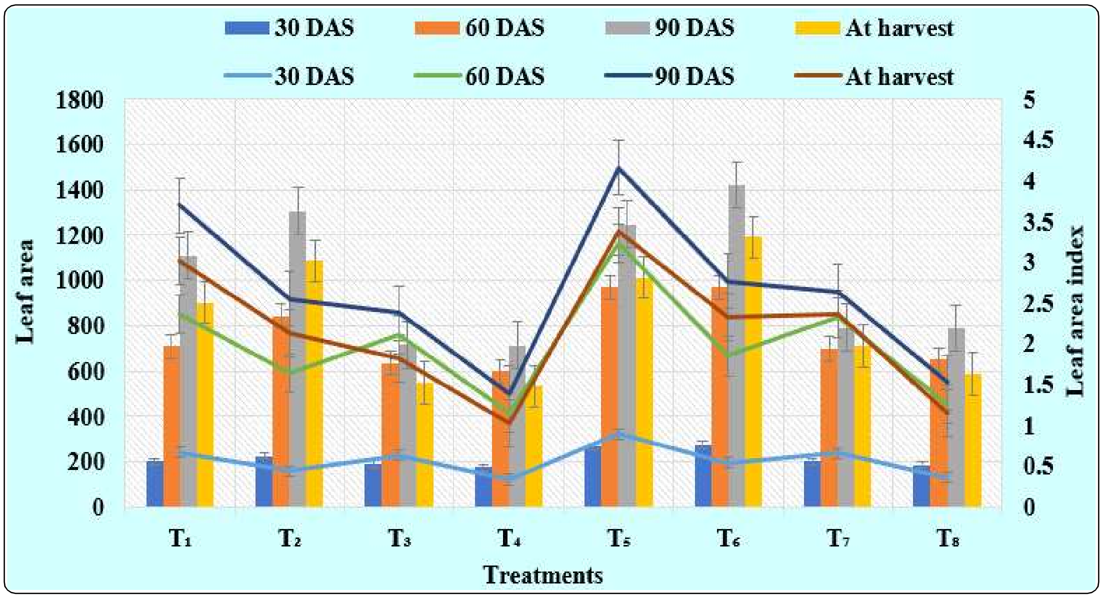

Fig. 1: Leaf area (cm^2 $plant^{-1}$) and leaf area index of groundnut at different growth stages as influenced by method of sowing, variety and spacing

and was followed by T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (1306 and 1087 cm^2 $plant^{-1}$). The increased leaf area per plant observed in the raised bed method may be attributed to the higher number of broader leaves, which can capture more sunlight for photosynthesis and enhances plant growth. This observation aligns with findings reported by Kadam *et al.* (2000).

The increase in Leaf Area Index at higher plant density was due to more number of plants and as a result of more leaves per unit area. LAI was recorded at different crop growth stages *viz.,* 30, 60, 90 DAS and at harvest. Leaf area index was progressively increased with the crop age, however it was decreased at harvest. Data pertaining to leaf area index of groundnut as influenced by different land configurations, varieties and spacings are depicted in Fig. 1. The leaf area increased progressively with crop growth until 90 DAS, after which it declined at harvest across all treatments. This might be due to more rapid dry matter accumulation in non-leaf area than leaf tissue. Significantly higher leaf area index at 30, 60, 90 DAS and at harvest was recorded in the T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (0.89, 3.23, 4.16 and 3.38, respectively) and was followed by T_1: Normal method + Kadiri Lepakshi + 30 cm x 10 cm (0.67, 2.36, 3.70 and 3.01, respectively). However, significantly lower leaf area index was found with T_4: Normal method + K-6 + 30 cm x 15 cm (0.34, 1.16, 1.39 and 1.02, respectively). Increasing plant density tend to decrease crop growth rate per plant, pod growth rate per plant and to increase leaf area index and crop growth rate per unit area (Reddy *et al.,* 2014). The increase in LAI with a higher plant population was attributed to the greater number of plants per unit area. However, by harvest, LAI decreased due to a reduction in the number of green leaves per plant (Bhargavi *et al.,* 2016).

Dry Matter Production

The data related to the influence of sowing method, varieties and spacing on dry matter accumulation per plant recorded at 30, 60, 90 DAS and at harvest stage of groundnut crop is presented in Table 3. Total dry matter increased with advancement of crop growth upto maturity in all the treatments.

At 30 DAS, dry matter accumulation showed no significant variation. However, numerically higher dry matter accumulation was observed at 60, 90 DAS and at harvest with the treatment combination T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm, recording 33.67, 54.70 & 66.85 g $plant^{-1}$, respectively.

TABLE 3

Dry matter production (g plant^{-1}) of groundnut at different growth stages as influenced by method of sowing, variety and spacing

Treatments	30 DAS			60 DAS			90 DAS			At harvest		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
T_1: Normal method + Kadiri Lepakshi +30cm x 10 cm	9.88	10.00	9.94	26.00	28.33	27.17	47.18	49.00	48.09	57.80	56.33	57.07
T_2: Normal method + Kadiri Lepakshi + 30cm x 15 cm	9.85	8.22	9.03	28.67	30.33	29.50	50.37	51.15	50.76	58.58	59.00	58.79
T_3: Normal method + K-6 + 30cm x 10 cm	9.84	9.56	9.70	20.00	24.90	22.45	38.23	40.40	39.32	44.00	43.33	43.67
T_4: Normal method + K-6 + 30cm x 15 cm	9.90	9.36	9.63	19.00	25.00	22.00	37.18	39.28	38.23	42.97	45.26	44.12
T_5: Raised bed + Kadiri Lepakshi + 30cm x 10 cm	10.40	10.11	10.26	30.67	33.67	32.17	53.23	53.90	53.57	64.70	65.22	64.96
T_6: Raised bed + Kadiri Lepakshi + 30cm x 15 cm	10.60	9.43	10.02	32.67	34.67	33.67	54.00	55.40	54.70	66.70	67.00	66.85
T_7: Raised bed + K-6 + 30cm x 10 cm	9.56	9.87	9.72	24.00	27.33	25.67	44.70	46.70	45.70	51.49	51.67	51.58
T_8: Raised bed + K-6 + 30cm x 15 cm	10.27	9.34	9.80	22.33	26.67	24.50	43.90	44.30	44.10	49.70	49.79	49.75
S. Em. ±	0.44	0.40	0.39	1.13	1.28	1.11	1.95	1.97	1.92	2.25	2.47	2.26
C. D. at 5%	NS	NS	NS	3.44	3.90	3.39	5.94	6.00	5.82	6.85	7.49	6.87

This was statistically comparable to T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm, which recorded 32.17, 53.57 and 64.96 g plant^{-1}, respectively. In contrast, the lower dry matter accumulation was recorded in T_4: Normal method + K-6 + 30 cm x 15 cm with values of 22.00, 38.23 and 44.12 g plant^{-1}, respectively. This difference could be attributed to the superior growth and growth attributes seen in raised bed configuration, which promoted overall better growth and higher dry matter accumulation. These findings are in line with the results reported by Lomte *et al.* (2006). Significant and higher plant dry weight was observed with the spacing of 30 cm × 15 cm, which might be due to increased dry matter production with advancing growth stages and reached the maximum at harvest resulting in higher dry weight of the plant. Similar results were also reported by Varshitha *et al.* (2022).

Yield Attributes and Yield

Data regarding the influence of method of sowing, variety and spacing on total number of pods per plant recorded at harvest is presented in Fig. 2. Data revealed that significantly higher number of pods per plant at harvest as influenced by different methods of sowing, variety and spacing was recorded in T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (63) and was followed by T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (58). Further, significantly lower number of pods per plant was observed in T_4: Normal method + K-6 + 30 cm x 15 cm (23), followed by T_3: Normal method + K-6 + 30 cm x 10 cm (24). Higher number of pods per plant were observed with wider spacing might be due to the presence of sufficient space for the penetration of pegs, development of pods and raised bed method of land configuration favours better penetration of peg into the soil. The results are in accordance with Santo and Gyasi (2011), Mvumi *et al.* (2018), Sunilkumar *et al.* (2020) and Walia *et al.* (2021). The increased number of branches and more reproductive growth and conversion of flowers into pods with the support of more conserved soil moisture at peak period of pod

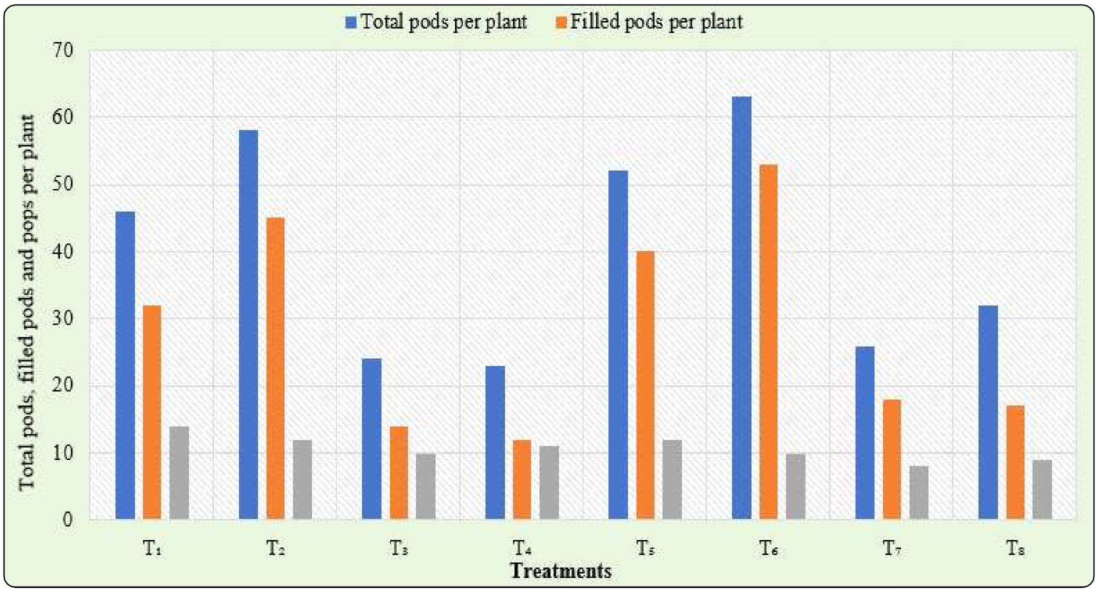

Fig. 2 : Yield attributes of groundnut as influenced by method of sowing, variety and spacing

initiation might have resulted in increased number of pods per plant. Similar results were also reported by Chandrasekaran *et al.* (2007) and Dikey *et al.* (2013). The difference in the number of pods produced by the two genotypes could be attributed to the genetic differences between the respective cultivars due to production of more branches per plant in turn more flowers and pegs in Kadiri Lepakshi resulted in production of greater number of pods per plant.

The data on filled pods per plant as influenced by method of sowing, variety and spacing is presented in Fig. 2. The results revealed that the filled pods were significantly affected by the method of sowing, variety and spacing. Cultivating Kadiri Lepakshi groundnut in raised bed method of land configuration by adopting 30 cm x 15 cm spacing (T_6) recorded significantly higher number of filled pods per plant (53) and was followed by T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (45). Further, T_4: Normal method + K-6 + 30 cm x 15 cm (12) recorded significantly lower number of filled pods per plant and it was followed by T_3: Normal method + K-6 + 30 cm x 10 cm (14).

The pops or unfilled pods per plant were influenced by method of sowing, variety & spacing. Significantly lower number of pops per plant (8.0) was recorded with K-6 groundnut when grown on raised bed with 30 cm x 20 cm spacing (T_7) and found on par with T_8: Raised bed + K-6 + 30 cm x 15 cm (9.0). Whereas, significantly higher number of pops per plant was recorded under T_1: Normal method + Kadiri Lepakshi + 30 cm x 10 cm (14.0) and was followed by T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (12.0). Increase in the number of pops per plant at narrow spacing might be due to the decrease in number of branches per plant and severe competition offered for growth resources coupled with poor source sink relationship (Mohamed, 2005).

The pod yield of groundnut as influenced by method of sowing, variety and spacing is presented in Table 4. By adopting the spacing of 30 cm x 10 cm with raised bed method of land configuration for Kadiri Lepakshi groundnut (T_6) recorded significantly higher pod yield (2471 kg ha^{-1}) and was found on par with T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (2417 kg ha^{-1}) and T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (2260 kg ha^{-1}). Whereas, T_4: Normal method + K-6 + 30 cm x 15 cm recorded lower pod yield of groundnut (1329 kg ha^{-1}) as compared to other treatments. Significantly higher

TABLE 4

Pod yield, kernel yield and harvest index of groundnut as influenced by method of sowing, variety and spacing

Treatments	Pod yield (kg ha^{-1})			Kernel yield (kg ha^{-1})			Harvest index		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
T_1: Normal method+Kadiri Lepakshi+30 cm x10cm	2237	2141	2189	1463	1406	1435	0.38	0.39	0.38
T_2: Normal method+Kadiri Lepakshi+30cm x15cm	2364	2156	2260	1570	1445	1508	0.40	0.39	0.39
T_3: Normal method+K-6 + 30 cm x10 cm	1669	1672	1670	989	1014	1002	0.37	0.36	0.37
T_4: Normal method+K-6 + 30 cm x 15 cm	1370	1289	1329	808	765	787	0.35	0.35	0.35
T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm	2446	2389	2417	1672	1632	1652	0.40	0.39	0.39
T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm	2486	2456	2471	1730	1736	1733	0.41	0.40	0.40
T_7: Raised bed + K-6 + 30 cm x 10 cm	1779	1666	1723	1134	1016	1075	0.38	0.38	0.38
T_8: Raised bed + K-6 + 30 cm x 15 cm	1487	1380	1434	927	856	891	0.36	0.38	0.37
S. Em. ±	87.83	90.41	83.97	71.38	74.78	74.52	0.01	0.01	0.01
C. D. at 5%	266.42	274.25	254.70	216.52	226.84	226.05	NS	NS	NS

kernel yield was recorded with T6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm (1733 kg ha^{-1}), which is superior to other treatments and was found on par with T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (1652 kg ha^{-1}) and T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (1508 kg ha^{-1}). Whereas, lower kernel yield was observed in T_4: Normal method + K-6 + 30 cm x 15 cm (787 kg ha^{-1}) and was followed by T_8: Raised bed + K-6 + 30 cm x 15 cm (891 kg ha^{-1}) as compared to other treatments.

The crop yield is influenced by various growth characteristics. Therefore, the increased pod yield observed under raised bed method could be attributed to factors such as more functional leaves, a larger leaf area, a higher number of branches and increased dry matter production. The rise in pod yield aligns with the findings of Nikam and Firake (2002). Similarly, Reddy *et al.* (2022) reported an increased yield by 20.59 per cent with trench cum bunding in groundnut. Significant and higher kernel yield was observed with the spacing of 30 cm × 15 cm which might be due to the better space, making water and nutrients more easily accessible to the plants. Plants were able to reach their full growth potential and produce higher yield due to increased surface area exposed to air, better cultural practises and more efficient weed management. These results corroborated with the findings of Meena *et al.* (2011).

The harvest index remained unaffected due to different method of sowing, variety and spacing. However, T_6: Raised bed + Kadiri Lepakshi + 30 cm x 15 cm recorded numerically higher harvest index (0.40) and it was followed by T_5: Raised bed + Kadiri Lepakshi + 30 cm x 10 cm (0.39) and T_2: Normal method + Kadiri Lepakshi + 30 cm x 15 cm (0.39). Whereas, T_4: Normal method + K-6 + 30 cm x 15 cm recorded lower harvest index of 0.35 as compared to other treatments.

Higher growth, yield attributes, kernel and pod yield in the cultivation of groundnut can be achieved by growing Kadiri Lepakshi groundnut variety in Raised bed by adopting 30 cm x 15 cm. Based on the results obtained from the current investigation and the discussed potential reasons for their variability, the following conclusions were made. Cultivation of Kadiri Lepakshi groundnut in raised bed with spacing of 30 cm x 15 cm recorded significantly higher pod yield (2471 kg ha^{-1}) and kernel yield (1733 kg ha^{-1}) and remained on par with Raised bed method + Kadiri Lepakshi + 30 cm x 10 cm (2417 and 1632 kg ha^{-1}, respectively).

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