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Influence of residual organic sources on growth and yield of groundnut in finger millet-groundnut cropping sequence

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Abstract
The cultivated groundnut (*Arachis hypogaea* L.) is an important annual legume originated in the Bolivia in South America which is now grown throughout the tropical, subtropical and warm temperate regions of the world. In India it is grown over an area of about 6.01 m ha with 10.24 m t production and productivity of 1700 kg ha^{-1}. A field experiment was conducted at research and demonstration block of Research Institute on Organic Farming, UAS, GKVK, Bengaluru during summer 2022 and 2023 to study the influence of residual organic sources on growth and yield of groundnut in finger millet-groundnut cropping sequence. The experiment was laid out in randomized block design with factorial concept and replicated thrice. The experiment consists of 12 treatment combinations of two levels of N equivalent and six organic sources along with control and UAS-B package. The experimental results indicated that application of bio-compost at 150% N equivalent resulted significantly higher plant height (46.99 cm), number of leaves per plant (40.28), pod yield (1821 kg ha^{-1}) and hulm yield (2938 kg ha^{-1}) of groundnut and was on par with poultry manure. Whereas, lower plant height (23.15 cm), number of leaves per plant (20.12), pod yield (937 kg ha^{-1}) and hulm yield (937 kg ha^{-1}) was recorded in control plots.

Keywords: Residual organic sources, bio-compost, groundnut, cropping sequence

Introduction
The cultivated groundnut (*Arachis hypogaea* L.) is an important annual legume originated in the Bolivia in South America which is now grown throughout the tropical, subtropical and warm temperate regions of the world. In India it is grown over an area of about 6.01 m ha with 10.24 m t production and productivity of 1700 kg ha^{-1}. Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra are principal groundnut growing states which account for more than 80 percent of Indian production as well as area. In Karnataka, it is cultivated in both kharif and rabi / summer seasons and accounts for an area of 0.72 m ha and contributes 0.72 m t production with a productivity of 990 kg ha^{-1} (Anon., 2022) [2]. Being a leguminous crop, it has an inherent capacity to fix atmospheric nitrogen. The finger millet-groundnut cropping system offers numerous benefits, it enhances soil fertility, boosts the presence of essential nutrients like organic carbon, nitrogen, and phosphorous, and effectively suppresses weed growth by smothering unwanted plants. This cropping system also results in increased production per unit area, optimizes land use, reduces runoff and soil erosion, and offers various other advantages. Additionally, the incorporation of leguminous crops in this system ensures sustainability by enriching soil fertility and enhancing overall productivity and economic returns. Over the years, the condition of Indian soils has deteriorated, leading to a decline in organic carbon levels, soil biodiversity, and physico-chemical properties. This degradation has also caused widespread nutrient deficiencies across a significant area due to reduced use of organic manures, imbalanced fertilizer application, and monoculture practices. Alarming reports indicate that different crops remove 10-12 million tonnes more nutrients from the soil annually than are replenished from various sources, resulting in a negative nutrient balance. Organic agriculture is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent possible, organic farming system relies on crop rotations, crop residues, animal manures, legumes, green manures, on-farm organic wastes and aspects of biological pest control to maintain soil productivity and health. Keep these points in view, the research was carried out at research and demonstration block of Research Institute on

Organic Farming, UAS, GKVK, Bengaluru to study the influence of residual organic sources on growth and yield of groundnut in finger millet-groundnut cropping sequence.

Materials and Methods

A field experiment was conducted at research and demonstration block of Research Institute on Organic Farming (RIOF), Gandhi Krishi Vignan Kendra (GKVK), University of Agricultural Sciences, Bangalore. It is situated in Eastern Dry Zone of Karnataka at latitude of 13° 09' North, longitude of 77º 57' East and an altitude of 924 m above mean sea level (MSL). Studies were conducted to know the influence of organic sources on growth and yield of finger millet during *kharif* 2021 and to assess the residual effect on growth and yield of groundnut during summer 2022 and same sequence was followed during *kharif* 2022 and summer 2023. The experiment consists of 12 treatment combinations of two levels of N equivalent (N_1: 100% N equivalent; N_2; 150% N equivalent) and six organic sources (F_1: FYM; F_2: Bio-compost; F_3: Urban compost; F_4: Vermicompost; F_5: Poultry manure (pre-cured); F_6: Jeevamrutha) along with control and UAS-B package was laid out in randomized block design with factorial concept and replicated thrice. Finger millet was sown during *kharif* with spacing of 30 cm × 10 cm and followed agronomic practices for cultivating the crop. Nutrient sources *viz.*, bio-compost, poultry manure vermicompost, urban compost, FYM and jeevamrutha were applied on N equivalent basis after analyzing the nutrient content. 50 percent N equivalent jeevamrutha was added as a basal application remaining 25 percent at tillering stage and 25 percent at flowering stage. 7.5 t FYM ha^{-1} was applied for all the treatments as per package of practice whereas, groundnut (Kadiri Lepakshi) crop was sown after harvest of finger millet at a spacing of 30 cm × 15 cm without application of organic nutrient sources.

Biometric observations on growth parameters were recorded randomly on selected five plants at 30, 60, 90 days after sowing and at harvest in net plot. Data related to yield was recorded at the time of harvest of the crop. Based on the observations, data were subjected to statistical analysis as per the procedure outline by Gomez and Gomez (1984) [5]. To know the effect of individual factors and to compare treatment combinations with control treatments, statistical procedure of factorial randomized complete block design was followed, respectively.

Results and Discussion

Plant height (cm)

The pooled data on plant height recorded at different growth stages of groundnut as influenced by application of organic sources in finger millet-groundnut cropping sequence is presented in Table 1. Plant height of groundnut varied significantly at 30, 60, 90 DAS and at harvest as influenced by organic sources applied at different N equivalent levels. Application of organic sources at 150% N equivalent recorded higher plant height (16.62, 26.20, 31.94 and 40.70 cm at 30, 60, 90 DAS and at harvest, respectively) over 100% N equivalent (14.61, 22.84, 27.57 and 33.26 cm at 30, 60, 90 DAS and at harvest, respectively).

Among organic sources, application of bio-compost resulted in significantly higher plant height (16.86, 26.80, 32.19 and 41.41 cm at 30, 60, 90 DAS and at harvest, respectively), which was on par with poultry manure (16.40, 25.96, 31.35 and 39.30 cm at 30, 60, 90 DAS and at harvest, respectively) followed by vermicompost (15.46, 24.10, 30.20 and 37.20 cm at 30, 60, 90 DAS and at harvest, respectively), urban compost (15.23, 23.91, 29.80 and 35.92 cm at 30, 60, 90 DAS and at harvest, respectively) and farm yard manure (15.14, 23.58, 29.00 and 35.19 cm at 30, 60, 90 DAS and at harvest, respectively). Whereas, lower plant height was recorded in jeevamrutha applied plots (14.58, 22.79, 26.00 and 32.84 cm at 30, 60, 90 DAS and at harvest, respectively).

Interaction effect between organic sources and levels of nitrogen was found to be significant. Application of bio-compost at 150% N equivalent recorded higher plant height (18.60, 30.04, 34.91 and 46.99 cm at 30, 60, 90 DAS and at harvest, respectively) which was on par with the application of poultry manure at 150% N equivalent (17.76, 28.58, 33.48 and 43.88 cm at 30, 60, 90 DAS and at harvest, respectively). Lower plant height was observed in control plots (11.98, 15.57, 19.04 and 23.15 cm at 30, 60, 90 DAS and at harvest, respectively). These findings align with the research conducted by Nehra and Hooda (2002) [8] as well as Naik and Rao (2004) [7], both of whom documented that the application of press mud/bio-compost led to increase in lentil plant height. Increased availability of nutrients in soil resulting from the mineralization of organic nutrient sources may have initiated cell elongation and proliferation, contributing to an accelerated growth rate of groundnut shoots and consequently, an increase in plant height. Similar results were obtained by Ashwini *et al.* (2015) [3]. The results are in line with the findings of Singh *et al*. (2004) [12] who reported that the residual effect of organic and inorganic sources of nutrients applied to the rice crop significantly increased the plant height, number of branches per plant, and other growth attributes of Lentil crop grown in the same field as residual crop.

Number of leaves per plant

Number of leaves per plant of groundnut varied significantly at 30, 60, 90 DAS and at harvest (Table 2). Higher number of leaves per plant (26.61, 38.23, 45.53 and 36.58 at 30, 60, 90 DAS and at harvest, respectively) was observed with the application of organic sources at 150% N equivalent and lower number of leaves per plant (22.42, 32.19, 38.33 and 30.80 at 30, 60, 90 DAS and at harvest, respectively) was observed at 100% N equivalent.

Among organic sources, application of bio-compost resulted in significantly higher number of leaves per plant (26.65, 38.29, 45.60 and 36.63 at 30, 60, 90 DAS and at harvest, respectively), which was on par with poultry manure (25.83, 37.11, 44.20 and 35.51 at 30, 60, 90 DAS and at harvest, respectively), followed by vermicompost (24.97, 35.87, 42.72 and 34.32 cm at 30, 60, 90 DAS and at harvest, respectively), urban compost (24.64, 35.39, 42.14, 33.86 and 35.92 at 30, 60, 90 DAS and at harvest, respectively) and farm yard manure (23.63, 33.94, 40.42 and 32.47 at 30, 60, 90 DAS and at harvest, respectively). Lower number leaves per plant was noticed in jeevamrutha applied plots (21.36, 30.66, 36.51 and 29.33 at 30, 60, 90 DAS and at harvest, respectively).

The interaction effect between nitrogen equivalents and organic sources found to be significant. Higher number of leaves per plant was recorded with application of bio-compost at 150% N equivalent (29.28, 42.10, 50.13 and 40.28 at 30, 60, 90 DAS and at harvest, respectively) and was on par with poultry manure at 150% N equivalent (27.76, 39.89, 47.51 and 38.17 at 30, 60, 90 DAS and at harvest, respectively). Lower number of leaves per plant was observed in control plots (14.68, 21.04, 25.04 and 20.12 at 30, 60, 90 DAS and at harvest, respectively). Higher number of leaves can be attributed to an increased supply of available nutrients, notably nitrogen to the plants. Additionally, these organic manures have improved the proportion of water-stable soil aggregates. This improvement can be ascribed to the bonding effect of polysaccharides and other organic compounds released during the decomposition of organic matter. As a result, these factors have led to taller plants, higher number of leaves, increased tiller formation, and ultimately, enhanced final yield. The distinct effects of FYM in comparison to bio-compost, vermicompost and poultry manure may be attributed to the fact that bio-compost, poultry manure, and vermicompost release nitrogen more rapidly due to their higher mineralization rates when compared to FYM. This accelerated nitrogen release facilitates nutrient availability to plants throughout their growth cycle, consequently contributing to the improvement of various growth parameters (Channabasanagowda *et al.*, 2008) [4].

Pod yield (kg ha^{-1}), haulm yield (kg ha^{-1}) and harvest index

Pod and haulm yield of groundnut (Table 3) differed significantly due to influence of organic sources in finger millet-groundnut cropping sequence. Higher pod and haulm yield of groundnut were obtained with the application of 150% N equivalent (1659 and 2547 kg ha^{-1}, respectively) compared to 100% N equivalent (1414 and 2070 kg ha^{-1}, respectively).

Among organic sources, application of bio-compost produced higher pod and haulm yield (2561 and 2586 kg ha^{-1}, respectively) which was on par with poultry manure (1619 and 2456 kg ha^{-1}, respectively) and found significantly superior over other treatments in the study. Lower pod and haulm yield were obtained in jeevamrutha applied plots (1339 and 2034 kg ha^{-1}, respectively). Interaction between nitrogen equivalents and organic sources found to be significant. Application of bio-compost at 150% N equivalent (1821 and 2938 kg ha^{-1}, respectively) recorded higher pod and haulm yield and was on par with the poultry manure at 150% N equivalent (1735 and 2748 kg ha^{-1}, respectively). Lower pod and haulm yield were recorded in control plots (937 and 1339 kg ha^{-1}, respectively).

Application of organic sources in finger millet-groundnut cropping sequence did not influence on harvest index of groundnut and it was found to be statistically non-significant for nitrogen equivalents, organic sources and interaction effect between nitrogen equivalents and organic sources.

Yield in groundnut is a result of various yield-contributing factors. The increased pod and haulm yield observed in groundnut can be ascribed to improved translocation of photosynthates from the source to the sink, as well as favorable growth-related characteristics. These growth-related factors include a higher leaf count, increased production of dry matter, improved yield components and enhanced nutrient availability. The variations in pod and haulm weight per plant across different treatments for groundnut may be attributed to differences in nutrient concentrations present in various organic manures used as treatments. The results agree with the findings of Ananda *et al.* (2006) [1], Sheshadri Reddy (2005) [11], Waghmode (2010) [13], Latha and Sharanappa (2014) [6], Pradeep Gopakkali and Sharanappa (2014) [9] and Shashidara (2014) [10] who reported increase in the yield.

Table 1: Plant height of groundnut at different growth stages as influenced by residual effect of organic sources in finger millet-groundnut cropping sequence

Treatments	30 DAS			60 DAS			90 DAS			At harvest		
	I	II	Pooled	I	II	Pooled	I	II	Pooled	I	II	Pooled
Nitrogen levels (N)												
N_1	14.06	15.15	14.61	22.28	23.39	22.84	26.49	28.65	27.57	32.90	33.61	33.26
N_2	15.85	17.38	16.62	25.56	26.84	26.20	30.69	33.20	31.94	40.27	41.13	40.70
S. Em ±	0.12	0.23	0.13	0.34	0.36	0.35	0.37	0.40	0.39	0.45	0.46	0.45
C.D. (p=0.05)	0.36	0.68	0.39	0.99	1.04	1.02	1.09	1.17	1.13	1.31	1.34	1.33
Organic sources (F)												
F_1	14.63	15.64	15.14	23.00	24.15	23.58	27.87	30.14	29.00	34.82	35.56	35.19
F_2	15.94	17.78	16.86	26.15	27.45	26.80	30.92	33.45	32.19	40.98	41.85	41.41
F_3	14.61	15.86	15.23	23.32	24.49	23.91	28.63	30.97	29.80	35.54	36.30	35.92
F_4	14.93	15.99	15.46	23.51	24.68	24.10	29.01	31.38	30.20	36.81	37.60	37.20
F_5	15.57	17.22	16.40	25.32	26.59	25.96	30.12	32.58	31.35	38.89	39.72	39.30
F_6	14.04	15.12	14.58	22.23	23.34	22.79	24.98	27.02	26.00	32.49	33.18	32.84
S. Em ±	0.21	0.40	0.23	0.59	0.62	0.60	0.64	0.69	0.67	0.78	0.79	0.78
C.D. (p=0.05)	0.62	1.17	0.68	1.72	1.81	1.76	1.88	2.03	1.96	2.28	2.32	2.30
Interaction (N x F)												
N_1F_1	13.97	14.96	14.46	22.00	23.10	22.55	26.47	28.64	27.55	32.27	32.96	32.62
N_1F_2	14.60	15.63	15.11	22.98	24.13	23.56	28.31	30.62	29.46	35.46	36.22	35.84
N_1F_3	13.89	15.19	14.54	22.33	23.45	22.89	27.39	29.62	28.51	33.32	34.03	33.68
N_1F_4	14.49	15.26	14.88	22.44	23.56	23.00	27.75	30.02	28.89	33.84	34.56	34.20
N_1F_5	14.58	15.48	15.03	22.76	23.90	23.33	28.07	30.37	29.22	34.37	35.10	34.73
N_1F_6	12.84	14.39	13.62	21.16	22.22	21.69	20.93	22.64	21.79	28.17	28.77	28.47
N_2F_1	15.30	16.32	15.81	24.01	25.21	24.61	29.26	31.65	30.45	37.37	38.16	37.76
N_2F_2	17.28	19.93	18.60	29.31	30.77	30.04	33.54	36.28	34.91	46.49	47.48	46.99
N_2F_3	15.33	16.54	15.93	24.32	25.53	24.92	29.87	32.31	31.09	37.76	38.57	38.16
N_2F_4	15.37	16.71	16.04	24.57	25.80	25.19	30.27	32.75	31.51	39.78	40.63	40.21
N_2F_5	16.57	18.96	17.76	27.89	29.28	28.58	32.17	34.80	33.48	43.41	44.34	43.88
N_2F_6	15.24	15.84	15.54	23.30	24.47	23.88	29.02	31.39	30.21	36.81	37.60	37.20
S. Em ±	0.30	0.56	0.33	0.83	0.87	0.85	0.91	0.98	0.94	1.10	1.12	1.11
C.D. (p=0.05)	0.87	1.66	0.96	2.44	2.56	2.50	2.66	2.88	2.77	3.22	3.29	3.25
Control	11.68	12.28	11.98	15.19	15.95	15.57	18.30	19.79	19.04	22.90	23.39	23.15

RDF	12.72	13.51	13.12	16.84	17.68	17.26	19.21	20.78	19.99	25.86	26.41	26.14
S. Em ±	0.38	0.62	0.34	0.83	0.87	0.85	1.05	1.13	1.09	1.21	1.24	1.22
C.D. (p=0.05)	1.11	1.79	0.98	2.42	2.54	2.48	3.04	3.29	3.17	3.52	3.59	3.56

Note: N_1: 100 percent N equivalent; N_2: 150 percent N equivalent; F_1: Farm Yard Manure; F_2: Bio compost;
F_3: Urban compost; F_4: Vermicompost; F_5: Poultry manure (pre-cured); F_6: Jeevamrutha;
Control; RDF (50:40:37.5 kg N: P_2O_5: K_2O ha^{-1}); I: *Summer* 2022; II: *Summer* 2023

Table 2: Number of leaves per plant of groundnut at different growth stages as influenced by residual effect of organic sources in finger millet-groundnut cropping sequence

Treatments	30 DAS			60 DAS			90 DAS			At harvest		
	I	II	Pooled	I	II	Pooled	I	II	Pooled	I	II	Pooled
Nitrogen levels (N)												
N_1	22.14	22.69	22.42	31.81	32.57	32.19	37.88	38.79	38.33	29.71	31.88	30.80
N_2	26.28	26.94	26.61	37.78	38.68	38.23	44.98	46.07	45.53	35.29	37.86	36.58
S. Em ±	0.32	0.33	0.32	0.46	0.47	0.47	0.55	0.56	0.56	0.43	0.46	0.45
C.D. (p=0.05)	0.94	0.96	0.95	1.35	1.38	1.37	1.61	1.65	1.63	1.26	1.36	1.31
Organic sources (F)												
F_1	23.34	23.92	23.63	33.54	34.34	33.94	39.93	40.90	40.42	31.33	33.61	32.47
F_2	26.31	26.98	26.65	37.84	38.74	38.29	45.05	46.15	45.60	35.35	37.92	36.63
F_3	24.33	24.94	24.64	34.98	35.80	35.39	41.64	42.65	42.14	32.67	35.05	33.86
F_4	24.66	25.28	24.97	35.45	36.29	35.87	42.21	43.23	42.72	33.11	35.53	34.32
F_5	25.51	26.15	25.83	36.68	37.54	37.11	43.67	44.72	44.20	34.26	36.75	35.51
F_6	21.09	21.62	21.36	30.30	31.02	30.66	36.07	36.94	36.51	28.30	30.36	29.33
S. Em ±	0.55	0.57	0.56	0.80	0.82	0.81	0.95	0.98	0.96	0.75	0.80	0.77
C.D. (p=0.05)	1.62	1.67	1.64	2.34	2.40	2.37	2.79	2.86	2.83	2.19	2.35	2.27
Interaction (N x F)												
N_1F_1	21.72	22.27	22.00	31.21	31.95	31.58	37.16	38.05	37.61	29.15	31.28	30.21
N_1F_2	23.71	24.30	24.01	34.08	34.89	34.48	40.57	41.55	41.06	31.83	34.15	32.99
N_1F_3	23.09	23.66	23.37	33.18	33.96	33.57	39.50	40.45	39.98	30.99	33.25	32.12
N_1F_4	23.26	23.84	23.55	33.43	34.23	33.83	39.80	40.76	40.28	31.23	33.50	32.36
N_1F_5	23.61	24.20	23.90	33.93	34.73	34.33	40.39	41.37	40.88	31.69	34.00	32.84
N_1F_6	17.46	17.89	17.67	25.05	25.65	25.35	29.83	30.53	30.18	23.39	25.11	24.25
N_2F_1	24.95	25.58	25.27	35.87	36.72	36.30	42.71	43.74	43.23	33.51	35.95	34.73
N_2F_2	28.91	29.65	29.28	41.61	42.59	42.10	49.53	50.74	50.13	38.86	41.69	40.28
N_2F_3	25.58	26.22	25.90	36.78	37.64	37.21	43.78	44.84	44.31	34.35	36.85	35.60
N_2F_4	26.06	26.71	26.39	37.47	38.36	37.91	44.61	45.69	45.15	35.00	37.55	36.27
N_2F_5	27.42	28.10	27.76	39.43	40.36	39.89	46.94	48.08	47.51	36.83	39.51	38.17
N_2F_6	24.73	25.35	25.04	35.55	36.39	35.97	42.32	43.35	42.83	33.20	35.62	34.41
S. Em ±	0.78	0.80	0.79	1.13	1.16	1.14	1.35	1.38	1.36	1.06	1.13	1.09
C.D. (p=0.05)	2.30	2.36	2.33	3.32	3.39	3.35	3.95	4.05	4.00	3.10	3.32	3.21
Control	14.51	14.86	14.68	20.78	21.29	21.04	24.75	25.33	25.04	19.40	20.84	20.12
RDF	16.72	17.13	16.92	23.98	24.56	24.27	28.56	29.23	28.89	22.39	24.04	23.22
S. Em ±	0.83	0.85	0.84	1.19	1.22	1.21	1.42	1.45	1.44	1.11	1.19	1.15
C.D. (p=0.05)	2.40	2.46	2.43	3.46	3.54	3.50	4.12	4.23	4.17	3.24	3.47	3.35

Note: N_1: 100 percent N equivalent; N_2: 150 percent N equivalent; F_1: Farm Yard Manure; F_2: Bio compost;
F_3: Urban compost; F_4: Vermicompost; F_5: Poultry manure (pre-cured); F_6: Jeevamrutha;
Control; RDF (50:40:37.5 kg N: P_2O_5: K_2O ha^{-1}); I: *Summer* 2022; II: *Summer* 2023

Table 3: Pod yield, haulm yield and harvest index of groundnut as influenced by residual effect of organic sources in finger millet-groundnut cropping sequence

Treatments	Pod yield (kg ha^{-1})			Haulm yield (kg ha^{-1})			Harvest index (HI)		
	I	II	Pooled	I	II	Pooled	I	II	Pooled
Nitrogen levels (N)									
N_1	1394	1433	1414	2049	2092	2070	0.40	0.41	0.41
N_2	1615	1703	1659	2517	2578	2547	0.39	0.40	0.39
F test	*	*	*	*	*	*	NS	NS	NS
S. Em ±	19	21	19	28	29	28	-	-	-
C.D. (p=0.05)	57	61	55	81	84	82	-	-	-
Organic sources (F)									
F_1	1467	1511	1489	2176	2233	2204	0.40	0.40	0.40
F_2	1628	1706	1667	2561	2610	2586	0.39	0.40	0.39
F_3	1507	1576	1541	2221	2273	2247	0.40	0.41	0.41
F_4	1527	1597	1562	2301	2352	2326	0.40	0.40	0.40
F_5	1585	1653	1619	2431	2482	2456	0.40	0.40	0.40
F_6	1315	1364	1339	2007	2061	2034	0.40	0.40	0.40
F test	*	*	*	*	*	*	NS	NS	NS
S. Em ±	34	36	33	48	50	48	-	-	-

C.D. (p=0.05)	99	106	96	141	146	142	-	-	-
Interaction (N x F)									
N_1F_1	1393	1405	1399	2017	2061	2039	0.41	0.41	0.41
N_1F_2	1490	1535	1513	2216	2250	2233	0.40	0.41	0.40
N_1F_3	1441	1495	1468	2083	2118	2100	0.41	0.41	0.41
N_1F_4	1461	1506	1483	2115	2157	2136	0.41	0.41	0.41
N_1F_5	1478	1529	1503	2148	2182	2165	0.41	0.41	0.41
N_1F_6	1102	1127	1114	1713	1785	1749	0.39	0.39	0.39
N_2F_1	1540	1616	1578	2335	2404	2370	0.40	0.40	0.40
N_2F_2	1765	1876	1821	2906	2970	2938	0.38	0.39	0.38
N_2F_3	1572	1657	1615	2360	2429	2394	0.40	0.41	0.40
N_2F_4	1593	1689	1641	2486	2547	2517	0.39	0.40	0.39
N_2F_5	1693	1777	1735	2713	2782	2748	0.38	0.39	0.39
N_2F_6	1527	1602	1565	2301	2336	2318	0.40	0.41	0.40
F test	*	*	*	*	*	*	NS	NS	NS
S. Em ±	48	51	46	68	70	69	-	-	-
C.D. (p=0.05)	140	150	135	199	206	201	-	-	-
Control	940	934	937	1313	1366	1339	0.42	0.41	0.41
RDF	1011	1078	1045	1496	1549	1523	0.40	0.41	0.41
F test	*	*	*	*	*	*	NS	NS	NS
S. Em ±	56	54	52	83	84	83	-	-	-
C.D. (p=0.05)	163	157	151	241	244	241	-	-	-

Note: N_1: 100 percent N equivalent; N_2: 150 percent N equivalent; F_1: Farm Yard Manure; F_2: Bio compost; F_3: Urban compost; F_4: Vermicompost; F_5: Poultry manure (pre-cured); F_6: Jeevamrutha;
Control; RDF (50:40:37.5 kg N: P_2O_5: K_2O ha^{-1}); I: *Summer* 2022; II: *Summer* 2023

Conclusions

Application of bio-compost at 150% N equivalent (1821 and 2938 kg ha^{-1}, respectively) recorded higher pod and haulm yield. However, lower pod and haulm yield were recorded in control plots (937 and 1339 kg ha^{-1}, respectively).

References

1. Ananda MG, Ananda MR, Reddy VC, Ajayakumar MY. Influence of different nutrient sources on yield and its components and B:C ratio of paddy and groundnut in paddy- groundnut cropping system. Crop Res. 2006;31(3):329-333.
2. Anonymous., Area, production and productivity target; c2022. https://raitamitra.karnataka.gov.in/info-4/Agriculture+Statistics/en
3. Ashwini M, Umesha C, Sridhara CJ. Effect of enriched FYM and fertilizer levels on growth and yield components of aerobic rice (*Oryza sativa* L.). Trends Bio. Sci. 2015;8(10):2479-2486.
4. Channabasanagowda NK, Patil BBN, Patil JS, Awaknavar BT, Ninganur, Hunge R. Effect of organic manures on growth, seed yield and quality of wheat. Karnataka J Agric. Sci. 2008;21(3):366-368.
5. Gomez KA, Gomez AA, Statistical Procedures for Agricultural Research, Edition 2, John Willey, New York; c1984. p. 693.
6. Latha HS, Sharanappa. Effect of organic crop production technique on the quality of soil and crops, Sustainability of yield in groundnut onion sequential cropping system. Indian J Agril. Sci. 2014;84(8):999-1003.
7. Naik SK, Rao VS. Effect of pyrite in combination with organic manures (FYM and Pressmud) on growth and yield of sunflower (*Helianthus annuus* L.) genotypes grown in Alfisols and Vertisols. J Int. Academicia. 2004;8(3):383-387.
8. Nehra AS, Hooda IS. Influence of integrated use of organic manures and inorganic fertilizers on lentil and mung bean yields and soil properties. Res. Crops. 2002;3(1):11-16.
9. Gopakkali P, Sharanappa. Effect of organic production techniques on the growth, yield, quality and economics of chilli (*Capsicum anuum*) and soil quality in dry zone of Karnataka. Indian. J Agron. 2014;59(1):151-156.
10. Shashidara. Development and evaluation of organic production package for table purpose groundnut varieties in dry zones of Karnataka. Ph.D. Thesis, Univ. Agric. Sci., Bangalore; c2014.
11. Reddy SS. Effect of different organic manures on available NPK status and organic carbon after harvest of groundnut (*Arachis hypogea*). Crop Res. 2005;30(11):26-29.
12. Singh S, Singh RN, Prasad J, Kumar B. Effect of green manuring, FYM and biofertilizer in relation to fertilizer nitrogen on yield and major nutrient uptake by lentil in rice- lentil sequence cropping. J Indian Soc. Soil Sci. 2004;50(3):313-314.
13. Waghmode BR. Response of sweet corn (*Zea mays* L. *saccharata*) to different sources of organics. M.Sc. (Agri.) Thesis, Univ. Agril. Sci. Dharwad; c2010.