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Significance of different organic sources on growth attributes and yield of maize (*Zea mays* L.)

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Abstract
Maize (*Zea mays* L) is a versatile crop grown throughout the tropical as well as temperate regions of the world round the year. Globally, it is known as "Queen of cereals". In India, it is cultivated in an area of 9.56 million hectare with a production of 28.76 million tonnes and productivity of 3006 kg ha^{-1}. A field experiment was conducted at research and demonstration block of Research Institute on Organic Farming, UAS, GKVK, Bengaluru during *kharif* 2022 to study the significance of different sources on growth attributes and yield of maize (*Zea mays* l.) The experiment consists of 13 treatments laid out in randomized block design and replicated thrice. The experimental results indicated that at harvest, significantly higher plant height (189.94 cm), number of leaves plant^{-1} (10.70), leaf area per plant (5634.94 cm^2 plant^{-1}) and total dry matter accumulation (138.95 g plant^{-1}) was noticed in 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%). Whereas, lower plant height (92.87 cm), number of leaves plant^{-1} (4.65), leaf area per plant (2642.27 cm^2 plant^{-1}) and total dry matter accumulation (68.82 g plant^{-1}) was observed with the application of 75% N equivalent compost. Significantly higher kernel and stover yield of maize were produced with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + Panchyagavya (3%) (88.59 and 119.87 q ha^{-1}, respectively) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (83.65 and 113.08 q ha^{-1}, respectively). However, lower kernel and stover yield (58.68 and 74.18 q ha^{-1}, respectively) was observed in 75% N equivalent compost.

Keywords: Compost, jeevamrutha, panchagavya

Introduction
Maize (*Zea mays* L) is a versatile crop grown throughout the tropical as well as temperate regions of the world round the year. Globally, it is known as "Queen of cereals" because of its highest genetic yield potential ability among cereals. It is a C4 plant, utilizes solar energy even at higher radiation intensities more effectively and efficiently (Iderawumi and Friday, 2018) [8]. It is consumed by several million individuals in the underdeveloped globe, who rely on it for their protein and calorie needs. It contains roughly 11.2% protein, 8% oil, 70% carbohydrates, 2.3% crude fibre, 10.4% albumins, and 1.4% ash (Raut *et al*., 2017) [11]. Due to low level of gluten (a protein), its flour is regarded as heart patient-friendly nutrition (Rasool and Khan, 2016) [10]. The global acreage, production and productivity of maize are 206 m ha, 1215 m t, and 5.89 t ha^{-1}, respectively. In India, it is cultivated in an area of 9.56 million hectare with a production of 28.76 million tonnes and productivity of 3006 kg ha^{-1}. Karnataka alone contributes 14.88 percent of the total maize production with an area of 1.42 million hectare and production of 4.4 million tonnes (Anon., 2021) [2]. Organic sources are the plant and animal products that are used as source of plant nutrients and they release nutrients after their decomposition. Farm Yard Manure (FYM) is one of the important sources of organic manure for crop production. It contains 0.5 percent N, 0.2 percent P2O5 and 0.5 percent K2O under Indian conditions (Butterworth *et al*., 2003) [5]. Compost considered an effective element management strategy for keeping nitrogen (N) uptake and maize yields, reducing nitrogen loss and enhancing soil fertility. Jeevamrutha is a fermented liquid product prepared by mixing desi cow dung with cow urine, jaggery, pulse flour and handful of soil brought from bunds of the fields where cultivation is to be taken up. It boasts a substantial microbial presence that serves as a potent soil tonic, promoting microbial proliferation and acting as a catalyst for enhanced nutrient availability to crops. Panchagavya is one of the ancient Indian concoctions used in production and protection of different crops from the time immorial. In Sanskrit, Panchagavya

means a blend of five products obtained from cow mainly its dung, urine, milk, ghee and curd. It contains different macro and micro nutrients and large population of essential microbes. The solution contains a pH value of 3.7 to 3.8, Nitrogen of 1.28%, Phosphorus of 0.72%, Potassium of 2.23% and organic carbon of 17.45%. (Anon., 2018) [15]. The use of organic sources of nutrients has been proposed as one of the main pillars of sustainable agriculture as they provide large amounts of macro and micro nutrients for crop growth and eco-friendly besides being renewable alternatives to mineral fertilizers. The incorporation of organic manures improves the nutrient content and uptake. Although organic manures contain plant nutrients in small quantities as compared to the fertilizer, the presence of growth promoting principles like enzyme and hormones besides plant materials make them essential for improvement of soil fertility and productivity. Keeping the above in view and the known possible reasons, the present study "Significance of different organic sources on growth attributes and yield of maize (*Zea mays* L.)" was taken in Research Institute on Organic Farming, UAS, GKVK, Bengaluru.

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. Study was conducted to know the significance of different sources on growth attributes and yield of maize during kharif-2022. The experiment consists of 13 treatments laid out in randomized complete block design with three replications. Treatments involved T_1 75% N equivalent compost, T_2 100% N equivalent compost, T_3 125% N equivalent compost, T4 75% N equivalent compost + recommended FYM, T_5 100% N equivalent compost + recommended FYM, T_6 125% N equivalent compost + recommended FYM, T_7 75% N equivalent compost + jeevamrutha (1000 l ha^{-1}), T_8 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}), T_9 125% N equivalent compost+ jeevamrutha (1000 l ha^{-1}), T_{10} 75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%), T_{11} 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%), T_{12} 125% N equivalent- compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and T_{13} 100% N equivalent-compost + recommended FYM + jeevamrutha (1000 l ha^{-1}). After bringing the soil to a fine tilth, well decomposed recommended farmyard manure (7.5 t ha^{-1}) was applied to each plot two/three weeks prior to sowing and incorporated well in soil. Nutrient composition of organic manures *viz*., Farmyard manure, compost, jeevamrutha, panchyagavya were analyzed and applied to each treatment on nitrogen equivalent basis. Maize was sown during kharif-2022 with spacing of 60 cm × 30 cm and followed agronomic practices for cultivating the crop. 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) [7]. statistical procedure of randomized block design was followed, respectively.

Results and Discussion

The experiment results were discussed in the subsequent sub-headings:

Significance of different sources on growth attributes of maize

Plant height (cm)

The data pertaining to the effect of organic nutrient management on plant height of maize recorded at different growth stages (30, 60, 90 DAS and at harvest) are presented in Table 1. At 30 DAS, significantly taller plant height (40.28cm) was recorded with 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (39.55 cm). Whereas, lower plant height (22.62 cm) was recorded in 75% N equivalent compost. At 60 DAS, significantly higher plant height (102.36 cm) was observed with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was par with the application of 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (94.03 cm). Significantly lower plant height was recorded (59.83 cm) in 75% N equivalent compost.

At 90 DAS, application 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) siginificantly recorded taller plant height (173.81 cm) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (168.01 cm), followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (160.81 cm) and found significantly superior over other treatments in the study. However, lower plant height (88.94 cm) was observed in 75% N equivalent compost. At harvest, significantly higher plant height (189.94 cm) was noticed in 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (185.47 cm). Lower plant height (92.87 cm) was registered in 75% N equivalent compost. Higher plant height of maize with the application of compost may be attributed to higher amount of nutrients and foliar spray of panchagavya contains IAA and GA that stimulates plant growth and development. Addition of jeevamrutha as top dress has enhanced in nutrient release and beneficial microorganisms and contains growth promoting substances such as auxins, gibberlins, cytokinins, apart from having lower concentration of both macro and micro nutrients. This is in conformity with Devakumar *et al*. (2008) [14] and similar results by Korai *et al*. (2014) [9] revealed that there were pronounced positive effects of adding compost as well as N on plant height and dry weight of maize.

Table 1: Plant height of maize recorded at different growth stages as influenced by different organic sources of nutrients

Treatments	Plant height (cm)			
	30 DAS	60 DAS	90 DAS	At harvest
T_1:75% N equivalent compost	22.62	59.83	88.94	92.87
T_2:100% N equivalent compost	24.12	61.20	97.34	99.57
T_3:125% N equivalent Compost	26.65	67.36	109.81	118.77
T_4:75% N equivalent compost + recommended FYM	28.55	72.46	115.24	122.14
T_5:100% N equivalent compost + recommended FYM	31.72	76.56	120.17	129.10
T_6:125% N equivalent compost + recommended FYM	33.22	79.83	128.71	139.60
T_7:75% N equivalent compost + jeevamrutha (1000 l ha^{-1})	34.95	81.13	131.64	149.60
T_8:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	35.92	84.73	137.27	159.97
T_9:125% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	37.12	86.60	142.04	170.50
T_{10}:75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	38.05	89.03	154.01	173.94
T_{11}:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	39.55	94.03	168.01	185.47
T_{12}:125% N equivalent-compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	40.28	102.36	173.81	189.94
T_{13}:100% N equivalent- compost + recommended FYM + jeevamrutha (1000 l ha^{-1})	38.88	90.30	160.81	175.00
F-test	*	*	*	*
S.Em ±	1.15	3.74	4.22	4.66
C.D. at 5%	3.36	10.91	12.32	13.59

Number of green leaves per plant

Number of green leaves per plant of maize differed significantly at 30, 60, 90 DAS and at harvest as influenced by integrated organic sources in maize (Table 2). At 30 DAS, higher number of leaves $plant^{-1}$ (6.13) was recorded with application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with the application of 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (5.86). Lower number of leaves $plant^{-1}$ (3.00) was recorded in 75% N equivalent compost.

At 60 DAS, higher number of leaves $plant^{-1}$ (10.29) was observed with 125% N equivalent - compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (9.76) and followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (9.26). Whereas, lower number of leaves $plant^{-1}$ was observed in 75% N equivalent compost (4.13).

At 90 DAS, application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) significantly recorded higher number of leaves $plant^{-1}$ (11.03) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (10.46) and found superior than other treatments in the investigation. Whereas, lower number of leaves $plant^{-1}$ (5.13) was noticed with application 75% N equivalent compost. At harvest, 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) resulted in higher number of leaves $plant^{-1}$ (10.70) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (10.12) followed by 100% N equivalent-compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (9.70). However, lower number of leaves $plant^{-1}$ (4.65) was observed in 75% N equivalent compost. Initial rapid growth of maize plants may be attributed to higher growth rate of leaf and stem that has played a major role in increasing plant height. Increase in the number of leaves of maize mainly attributed to increase in plant height and availability of nutrients in adequate quantity at grand growth stages of the crop. Production of photosynthates and their translocation to sink depends upon availability of mineral nutrients in soil. The differences in the growth parameters could be attributed to rapid cell division and elongation through the effect of nitrogen (Korai *et al*., 2014) [9].

Table 2: Number of leaves per plant of maize recorded at different growth stages as influenced by different organic sources of nutrients

Treatments	Number of leaves $plant^{-1}$			
	30 DAS	60DAS	90DAS	At harvest
T_1:75% N equivalent compost	3.00	4.13	5.13	4.65
T_2:100% N equivalent compost	3.33	4.69	5.53	5.00
T_3:125% N equivalent Compost	3.63	5.23	5.93	5.65
T_4:75% N equivalent compost + recommended FYM	3.80	5.76	6.39	6.15
T_5:100% N equivalent compost + recommended FYM	4.26	6.29	6.86	6.59
T_6:125% N equivalent compost + recommended FYM	4.70	6.73	7.39	7.00
T_7:75% N equivalent compost + jeevamrutha (1000 l ha^{-1})	4.93	7.19	7.86	7.50
T_8:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	5.23	7.83	8.56	7.24
T_9:125% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	5.36	8.29	9.03	8.75
T_{10}:75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	5.50	8.89	9.49	9.31
T_{11}:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	5.86	9.76	10.46	10.12
T_{12}:125% N equivalent-compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	6.13	10.29	11.03	10.70
T_{13}:100% N equivalent- compost + recommended FYM + jeevamrutha (1000 l ha^{-1})	5.66	9.26	9.79	9.70
F-test	*	*	*	*
S.Em ±	0.22	0.34	0.37	0.22
C.D. at 5%	0.64	0.98	1.07	0.64

Leaf area (cm^2 plant^{-1})

The data on leaf area per plant of maize varied significantly as influenced by integrated organic source of nutrients at various growth stages (Table 3).

At 30 DAS, the higher leaf area (2248.97 cm2 plant^{-1}) was recorded with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) and was on par with application of 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (2114.97cm2 plant^{-1}) followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (2009.97 cm2 plant^{-1}) and 75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (1901.97 cm2 plant $^{-1}$). Lower leaf area per plant (1007.64 cm2 plant $^{-1}$) was recorded in 75% N equivalent compost.

The similar trend of leaf area per plant of maize was noticed at 60, 90 DAS and at harvest. However, higher leaf area per plant was recorded with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (4975.85, 6147.85 and 5634.94 cm2 plant^{-1} at 60, 90 and at harvest, respectively) and was on par with application of 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (4675.85, 5913.19and 5445.94 cm2 plant^{-1} at 60, 90 and at harvest, respectively). Whereas, lower leaf area per plant (2341.19, 2955.52 and 2642.27 cm2 plant^{-1} at 60, 90 and at harvest, respectively) was observed with application of 75% N equivalent compost. Increased availability of nutrients in soil due to mineralization of organic nutrient sources could have triggered cell elongation and multiplication resulting in high growth rate of shoot in turn increase in leaf area of maize compared to control. The results are in line with Ashwini *et al*. (2015) [3].

Table 3: leaf area (cm^2 plant^{-1}) of maize recorded at different growth stages as influenced by different organic sources of nutrients

Treatments	Leaf area (cm^2 plant^{-1})			
	30 DAS	60DAS	90DAS	At harvest
T_1:75% N equivalent compost	1007.64	2341.19	2955.52	2642.27
T_2:100% N equivalent compost	1133.97	2568.52	3244.85	2863.93
T_3:125% N equivalent Compost	1244.64	2744.85	3456.19	3034.93
T_4:75% N equivalent compost + recommended FYM	1308.31	2979.52	3664.52	3347.27
T_5:100% N equivalent compost + recommended FYM	1449.97	3054.85	3845.85	3645.60
T_6:125% N equivalent compost + recommended FYM	1508.97	3265.52	4051.52	3843.60
T_7:75% N equivalent compost + jeevamrutha (1000 l ha^{-1})	1612.31	3425.19	4252.52	4135.27
T_8:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	1704.97	3675.19	4654.85	4482.27
T_9:125% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	1864.97	3897.19	4955.19	4717.94
T_{10}:75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	1901.97	4153.85	5317.19	4942.94
T_{11}:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	2114.97	4675.85	5913.19	5445.94
T_{12}:125% N equivalent-compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	2248.97	4974.85	6147.85	5634.94
T_{13}:100% N equivalent- compost + recommended FYM + jeevamrutha (1000 l ha^{-1})	2009.97	4394.85	5648.85	5191.94
F-test	*	*	*	*
S.Em ±	49.69	108.63	136.78	131.73
C.D. at 5%	145.04	317.07	399.22	384.49

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

Data on total dry matter accumulation recorded at different growth stages of maize presented in Table 4. At 30 DAS, significantly higher total dry matter accumulation per plant of maize was registered in 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (8.23 g plant^{-1}) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (7.83 g plant^{-1}) followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (7.60 g plant^{-1}) and 75% N equivalentcompost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (7.10 g plant^{-1}). However, lower dry matter accumulation (3.78 g plant^{-1}) was recorded with application of 75% N equivalent compost. At 60 DAS, application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) recorded significantly higher total dry matter accumulation (68.98 and g plant^{-1}) and was on par with application of 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (67.65 plant^{-1}) which was followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (61.32 g plant^{-1}) and 75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (53.65 g plant^{-1}). Whereas, lower dry matter accumulation (33.58 g plant^{-1}) was noticed in 75% N equivalent compost.

At 90 DAS, significantly higher dry matter accumulation (109.63 g plant^{-1}) was recorded with application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with application of 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (103.30 g plant^{-1}) whereas, significantly lower total dry matter accumulation (54.83 g plant^{-1}) was observed in 75% N equivalent compost. At harvest, higher total dry matter accumulation (138.95 g plant^{-1}) was recorded in, 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) and was on par with the application 100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%) (130.62 g plant^{-1}). The lower total dry matter accumulation (68.82 g plant^{-1}) was recorded in 75% N equivalent compost. Total dry matter production is a result of dry matter accumulation in plant parts, which depends on uptake of nutrients like N, P and K., Due to the presence of humic acid sources in Panchagavya provides protoplasmic elements *viz*., N, P2O5 and K2O that assists in physiological functions of plant such as chlorophyll and protein synthesis which further increase the growth parameters like plant height, number of leaves and number of branches which in turn increased dry matter accumulation. This is in conformity with results of Vishwajit and Devakumar (2018) [14]. Application of organic manures and jeevamrutha has increased biological efficiency and greater sink capacity in the crop which might have helped in higher photosynthetic efficiency and absorption of nutrients (Roopashree *et al*., 2019) [12].

Table 4: Total dry matter (g plant^{-1}) of maize recorded at different growth stages as influenced by different organic sources of nutrients

Treatments	Total dry matter (g plant^{-1})			
	30 DAS	60DAS	90DAS	At harvest
T_1:75% N equivalent compost	3.78	33.58	54.83	68.82
T_2:100% N equivalent compost	3.82	34.25	55.83	70.65
T_3:125% N equivalent Compost	4.18	35.78	59.73	77.32
T_4:75% N equivalent compost + recommended FYM	4.44	38.08	61.93	82.15
T_5:100% N equivalent compost + recommended FYM	4.86	40.95	65.57	86.15
T_6:125% N equivalent compost + recommended FYM	5.22	43.25	72.43	93.62
T_7:75% N equivalent compost + jeevamrutha (1000 l ha^{-1})	5.57	46.65	76.83	97.29
T_8:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	6.11	51.92	82.63	104.95
T_9:125% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	6.60	53.65	85.30	109.62
T_{10}:75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	7.10	59.18	94.97	113.62
T_{11}:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	7.83	67.65	103.30	130.62
T_{12}:125% N equivalent-compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	8.23	68.98	109.63	138.95
T_{13}:100% N equivalent- compost + recommended FYM + jeevamrutha (1000 l ha^{-1})	7.60	61.32	96.63	123.95
F-test	*	*	*	*
S.Em ±	0.18	1.55	2.49	4.10
C.D. at 5%	0.54	4.53	7.27	11.96

Table 5: kernel yield (q ha^{-1}) and stover yield (q ha^{-1}) of maize recorded at different growth stages as influenced by different organic sources of nutrients

Treatments	Yield	
	Kernel yield (q ha^{-1})	Stover yield (q ha^{-1})
T_1:75% N equivalent compost	58.68	74.18
T_2:100% N equivalent compost	61.41	79.83
T_3:125% N equivalent compost	64.71	85.41
T_4:75% N equivalent compost + recommended FYM	65.95	88.02
T_5:100% N equivalent compost + recommended FYM	68.70	92.19
T_6:125% N equivalent compost + recommended FYM	70.85	94.06
T_7:75% N equivalent compost + jeevamrutha (1000 l ha^{-1})	72.94	95.09
T_8:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	74.31	97.36
T_9:125% N equivalent compost+ jeevamrutha (1000 l ha^{-1})	75.30	99.40
T_{10}:75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	77.63	104.80
T_{11}:100% N equivalent compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	83.65	113.08
T_{12}:125% N equivalent-compost+ jeevamrutha (1000 l ha^{-1}) + panchagavya (3%)	88.59	119.87
T_{13}:100% N equivalent- compost + recommended FYM + jeevamrutha (1000 l ha^{-1})	78.01	106.60
F-test	*	*
S.Em ±	3.03	4.26
C.D. at 5%	8.84	12.42

Significance of different sources on yield of maize

Kernel yield (q ha^{-1}) and stover yield (q ha^{-1})

The data on kernel and stover yield of maize varied significantly as influenced by different organic source of nutrients (Table 3).

Significantly higher kernel and stover yield of maize were produced with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + Panchyagavya (3%) (88.59 and 119.87 q ha^{-1}, respectively) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (83.65 and 113.08 q ha^{-1}, respectively) followed by 100% N equivalent compost + recommended FYM + jeevamrutha (1000 l ha^{-1}) (78.01 and 106.60 q ha^{-1}, respectively) and 75% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchagavya(3%) (77.63 and 104.80 q ha^{-1}, respectively). Whereas, lower yield (58.68 and 74.18 q ha^{-1}, respectively) was observed in 75% N equivalent compost.

The increase in yield parameters like number of kernel rows, number of kernels per row and test weight might be due to combined application of manures and jeevamrutha ensure the release of readily available nutrients in adequate quantity which promoted early growth as compared to sole organic manuring treatments, in which nutrients are available slowly over a long period of time and easy translocation of nutrients to the plant through foliar spray of panchagavya. The results are in line with Ananda and Sharanappa (2017) [1]. Higher growth and yield parameters could be attributed to availability of macronutrients and micronutrients from organic manure, which is very essential for plant growth and development (Boraiah *et al*., 2017) [4]. The lower grain yield due to reduced availability of nutrients for the crop during early growth stages (vegetative period) and thus the crop might have starved of nutrients during later stage (reproductive stage), which might have affected the grain and stover yield (Urkurkar *et al*., 2010) [13]. The increase in green fodder yield can be attributed to increase in plant height, number of leaves, leaf area, leaf area index and total dry matter production.

Conclusions

Significantly higher kernel and stover yield of maize were produced with the application of 125% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + Panchyagavya (3%) (88.59 and 119.87 q ha^{-1}, respectively) and was on par with 100% N equivalent compost + jeevamrutha (1000 l ha^{-1}) + panchyagavya (3%) (83.65 and 113.08 q ha^{-1}, respectively). Whereas, lower yield (58.68 and 74.18 q ha^{-1}, respectively) was observed in 75% N equivalent compost.

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