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Influence of Different Organic Manures on the Growth and Yield of Baby Corn

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Abstract: ***Field experiment was conducted at Agricultural College and Research Institute, Killikulam during Purattasipattam (September - October) of 2017 to study the Influence of different organic manures on the growth and yield of baby corn. Baby corn G 5414 was used as test variety. The field trail was laid out in randomized block design and replicated thrice. Three different organic manures were used viz., farmyard manure, poultry manure and vermicompost with or without panchagavya as foliar spray. Significantly higher values of growth parameters were registered with application of 100% N through poultry manure and higher green cob and green fodder yield was obtained with the application of 100% N through poultry manure (10920 kg ha^{-1} and 29797 kg ha^{-1} respectively) and it is superior to the rest of treatments. Application of 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage recorded higher green cob and green fodder yield (10418 kg ha^{-1} and 28636 kg ha^{-1} respectively). This was followed by the application of 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage and application of 50% N through farmyard manure + 50% N through poultry manure which registered higher green cob and green fodder yield (10401 kg ha^{-1} and 28498 kg ha^{-1} respectively, 10354 kg ha^{-1} and 28389 kg ha^{-1} respectively). These treatments were on par with each other. Application of 100% N through poultry manure produced significantly higher growth and yield of baby corn when compared to the rest of combinations.***

Keywords: ***Baby corn, Organic manures, Panchagavya, Growth and Yield***

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Introduction

Maize (*Zea mays* L) is the third most important cereal crop next to rice and wheat. Across the globe it is famous as queen of cereals since it possess higher genetic yield potential among other cereal crops *like* rice, wheat, oat, millets *etc*. Its significance lies in the way that it is not only utilized for human consumption and animal feed but also it is utilized by the industries for the production of corn oil, corn starch *etc*. Countries like Thailand and Taiwan achieved successful results due to the cultivation of baby corn. Later more attention is given on the cultivation of maize by the researchers and agriculturists to tap its potentialities for earning more foreign revenue in addition to get maximum returns to the producers. Baby corn is not a genetically dwarf maize as the name suggests it is the immature ear of normal maize. Baby corn ear are soft and consumed as vegetable by human being (Jinjala *et al*., 2016).

Baby corn contains protein up to 15 to 18 per cent and sugar 0.016 to 0.020 per cent. Organic farming is gaining importance in Indian agriculture on account of sustainability and quality of the crops being produced. It is being practiced in an area of 37.2 million hectares in 160 countries across the world, this constitutes about 0.9 per cent of the world's agricultural land (Kilcher *et al*., 2011).

In the old time, agriculture was practiced without the utilization of synthetic fertilizers. The utilization of synthetic substances for example, insecticide and fertilizer came into picture during mid-nineteenth century. This affected the fertility and productivity of the soil. Natural farming came into twentieth century. It made utilization of ecosystem friendly practices by keeping away the use of synthetic fertilizer and making use of natural organic sources to raise the crops. Natural nourishment is helpful to human health and the act of natural cultivation keeps the earth clean (Tyagi, 2016). About 25 to 30 per cent of nutrients needs of Indian agriculture can be met by different organic sources (Yadav *et al*., 2013).

Past few decades increased the consumption all of synthetic fertilizer reduced the usage of organic source of manures which affected the soil fertility. Using organic nutrient for crop production increased the sustainability and soil health without affecting the environment.

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Material and Methods

Field experiment was conducted at Agricultural College and Research Institute, Killikulam during Purattasipattam (September - October) of 2017.

Field trail was laid out in randomized block design replicated thrice using three different organic manures with or without panchagavya spray as per the treatment schedules *viz*., Control (T_1), 100% N through farmyard manure (T_2), 100% N through poultry manure (T_3), 100% N through vermicompost (T_4), 100% N through farmyard manure + 3% Panchagavya spray at vegetative and tasseling stage (T_5), 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_6), 100% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_7), 50% N through farmyard manure + 50% N through poultry manure (T_8), 50% N through farmyard manure + 50% N through vermicompost (T_9), 50% N through poultry manure + 50% N through vermicompost (T_{10}), 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_{11}), 50% N through farmyard manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{12}) and 50% N through poultry manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{13}). Application of organic manure was basal and panchagavya was sprayed at two different stages *viz*., vegetative and tasseling stages. Baby corn G 5414 seeds were sown adopting the seed rate of 25 kg ha^{-1} with a spacing adopted by 45 cm x 25 cm. Farmyard manure (0.52, 0.21 and 0.51 per cent N, P and K), Poultry manure (3.05, 2.59 and 1.45 per cent N, P and K) and Vermicompost (1.94, 1.01 and 0.66 per cent N, P and K) was used as an organic source of N and applied as per treatment schedule. For control, recommended quantity of fertilizer dose (150:60:40 kg NPK ha^{-1}) was applied. Whereas 50% of recommended dose of N and 100% recommended dose of P and K were applied as basal. The remaining 50% N was applied as top dressing on 25 DAS.

Results and Discussion

Growth parameters

Growth parameters of baby corn were significantly influenced by different organic manures and foliar application of panchagavya (Tables 1). Significantly increased plant height, leaf area index and dry matter production of baby corn were obtained with the application of 100% N through poultry manure and it is significantly superior to the rest of the treatments. Next to these treatments, application of 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage was the next best treatment. It was followed by the application of 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage and application of 50% N through farmyard manure + 50% N through poultry manure. These treatments were on par with above treatments. Organic sources of nutrition significantly increased the plant growth. (Choube, 2007) reported that application of organic manures increased the leaf area index. Similar observation was also reported by (Akongwubel *et al*., 2012). They observed significant improvement on plant height and leaf area index in corn with ultimate increase in organic manure rates. Organic manure supply essential nutrient elements to promote vigorous growth and physiological activities in the plant system. Increased the rate of poultry manure application significantly get higher plant height, leaf area index and dry matter production. Similar result was also observed by (Igua *et al*., 2009) and (Channal, 2017).

Yield attributes and yield

Yield attributes and yield of baby corn were significantly dominated by various organic manures and foliar application of panchagavya (Tables 2). Higher cob weight, cob length, cob girth, green cob yield and green fodder yield of baby corn were obtained with the application of 100% N through poultry manure. Next to these treatments, application of 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage was the next best treatment. It was followed by the application of 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage and application of 50% N through farmyard manure + 50% N through poultry manure. These treatments were on par with each other. The number of baby corn plant^{-1} was

found to increase with each increase in organic manures and panchagavya but it did not differ significantly. Well decomposed poultry manure either alone or combination with foliar application of panchagavya increased the yield and yield component of baby corn. Poultry manure contains high amount of nitrogen and panchagavya have growth promoting substance which might have helped to produce higher yield and yield component. (Khaliq *et al*., 2004) and (Enujeke, 2013) also observed similar results.

Conclusion

Present investigation concluded that application of 100% N through poultry manure was found to be the different organic nutrient management practices for maximized growth and yield of baby corn when compared to the rest of combinations.

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Table 1. Influence of different organic manures on the growth parameters of baby corn

Treatments	Plant height (cm)			Leaf area index		Dry matter production (kg ha^{-1})		
	30 DAS	45 DAS	Harvest	30 DAS	45 DAS	30 DAS	45 DAS	Harvest
T_1	96.9	128.1	175.6	3.91	6.31	1227	6801	11899
T_2	95.1	126.8	174.8	3.85	6.29	1181	6741	11748
T_3	107.8	144.2	192.2	4.53	7.20	1404	7734	13633
T_4	72.6	101.8	150.8	3.01	5.09	846	5676	9167
T_5	86.1	115.7	163.1	3.63	5.79	1008	6321	10536

T_6	103.2	137.6	184.2	4.30	6.80	1331	7331	12992
T_7	80.1	108.7	157.7	3.34	5.44	903	5997	9777
T_8	101.4	134.8	182.9	4.17	6.61	1308	7139	12579
T_9	89.3	119.1	165.9	3.70	5.87	1047	6479	10982
T_{10}	85.5	113.2	160.2	3.57	5.75	994	6298	10479
T_{11}	102.5	136.9	184.1	4.22	6.74	1319	7211	12854
T_{12}	92.7	121.4	169.7	3.71	5.98	1105	6519	11321
T_{13}	93.8	124.7	171.9	3.79	6.14	1141	6686	11551
SEd	1.5	2.7	3.2	0.06	0.15	22	141	237
CD (P=0.05)	3.1	5.5	6.6	0.13	0.31	45	291	489

Control (T_1), 100% N through farmyard manure (T_2), 100% N through poultry manure (T_3), 100% N through vermicompost (T_4), 100% N through farmyard manure + 3% Panchagavya spray at vegetative and tasseling stage (T_5), 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_6), 100% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_7), 50% N through farmyard manure + 50% N through poultry manure (T_8), 50% N through farmyard manure + 50% N through vermicompost (T_9), 50% N through poultry manure + 50% N through vermicompost (T_{10}), 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_{11}), 50% N through farmyard manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{12}) and 50% N through poultry manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{13}).

	baby corns pant^{-1}	**length (cm)**	**girth (cm)**	**yield (kg ha^{-1})**	**fodder yield (kg ha^{-1})**
T_1	2.4	19.4	9.5	9900	27184
T_2	2.3	19.0	9.3	9801	26899
T_3	2.5	23.9	11.4	10920	29797

T_4	2.1	13.7	6.1	7710	18901
T_5	2.3	16.2	7.9	8656	22867
T_6	2.5	22.4	10.7	10418	28636
T_7	2.3	14.8	6.9	8199	21198
T_8	2.5	21.9	10.3	10354	28389
T_9	2.3	17.1	8.3	8792	23635
T_{10}	2.3	16.0	7.6	8309	21999
T_{11}	2.5	22.3	10.5	10401	28498
T_{12}	2.2	17.5	8.5	9241	24989
T_{13}	2.4	18.2	8.9	9498	26011
SEd	0.1	0.4	0.2	190	510
CD (P=0.05)	NS	0.9	0.4	391	1053

Control (T_1), 100% N through farmyard manure (T_2), 100% N through poultry manure (T_3), 100% N through vermicompost (T_4), 100% N through farmyard manure + 3% Panchagavya spray at vegetative and tasseling stage (T_5), 100% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_6), 100% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_7), 50% N through farmyard manure + 50% N through poultry manure (T_8), 50% N through farmyard manure + 50% N through vermicompost (T_9), 50% N through poultry manure + 50% N through vermicompost (T_{10}), 50% N through farmyard manure + 50% N through poultry manure + 3% Panchagavya spray at vegetative and tasseling stage (T_{11}), 50% N through farmyard manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{12}) and 50% N through poultry manure + 50% N through vermicompost + 3% Panchagavya spray at vegetative and tasseling stage (T_{13}).

