RESEARCH ARTICLE

Effect of fertilizers, vermicompost and farmyard manure on growth of red dragon fruit (*Hylocereus costaricensis* (Web.) Britton and Rose)

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Rawat AK, Maji S, Mayaram, et al. Effect of fertilizers, vermicompost and farmyard manure on growth of red dragon fruit (*Hylocereus costaricensis* (Web.) Britton and Rose). AGBIR. 2022; 38(4):332-335.

Dragon fruit is well responsive to nutrient management. Vermicompost and Farm Yard Manure are better responsible than use of single manure for influencing both quantitative as well as qualitative aspects of dragon fruit. But there is limited information available regarding its fertilizer management in dragon fruit, for which present investigation was planned to see the influence of integrated nutrient management on growth of dragon fruit plant at Lucknow subtropical condition. There were 10 treatments (T_0-Control, T_1-Recommended dose fertilizer (RDF), T2-75% RDF+1 kg Vermicompost/pole, T_3-50% RDF+2 kg Vermicompost/pole, T_4-25% RDF+3 kg Vermicompost/pole, T_5-0% RDF+4 kg Vermicompost/pole, T_6-75% RDF+4 kg FYM/pole,T_7-50% RDF+6 kg FYM/pole, T_8-25% RDF+8 kg FYM/pole, T_9-0% RDF+10 kg FYM/pole) laid out in RBD design with 3 replications. The recorded observations on vegetative growth parameters revealed that application of organic (vemicompost and farm yard manure) and inorganic fertilizer (RDF) in the form of 75% RDF+4 kg FYM showed maximum vegetative growth followed by significant improvement with application of 75% RDF+1 kg vermicompost.

Key Words: *Dragon fruit; Fertilizers; Vermicompost; FYM*

INTRODUCTION

The dragon fruit (*Hylocereus costaricensis* (Web.) Britton and Rose) is a perennial climbing cactus belonging to the family Cactaceae (2n=22). The scientific name of dragon fruit is derived from the Greek word 'hyle' (meaning woody) and Latin word 'cereus' (meaning waxen). The flower is too beautiful and is nicked as Noble woman and the Queen of the night. These fruits are mostly available around June to November in garden but, are available almost year round in market [1], but price is very high. It is originated in Mexico and Central South America and is now commercially cultivated and distributed around the tropical regions, particularly in Vietnam and other Asian countries during late twenty century. In India, it is started as commercial crop in Andaman and Nicobar Island, Tamil Nadu, Andhra Pradesh, West Bengal, Maharashtra, Karnataka, Gujarat, Uttar Pradesh. There are three most commonly cultivated varieties of dragon fruit, red dragon fruit with red flesh and red skin, Dragon fruit with yellow skin and white flesh, and red dragon fruit with red skin and white flesh or dragon fruit pulp filled with lots of tiny black seed which are rich in essential fatty acid [2].

Dragon fruit has various health benefits because it is rich in vitamins, minerals, fats, carbohydrates, calcium, phosphorus, magnesium, phytochemicals, and antioxidants [3], betanin, phylocactin, hylocerenin and betacyanin with 5-O-glycosides or 6-O-glycosides. Dragon fruits help to lower blood sugars in type 2 diabetes. It is beneficial for heart problems, carbohydrate metabolism, strengthening bones and teethes, healthy for blood and tissue formation, fight against respiratory tract infections, strengthening immune system, faster healing of bruises and wounds and even as a mixed laxative due to substantial fiber content, prevent colon cancer, enhance kidney function, increase eye focal length. It contains B group vitamins (B1, B2, and B3) important for health benefits.

It is very ideal to grow in most parts of India besides the area with less rainfall. Dragon fruit plants prefer tropical climate with an average temperature of 20°C -29°C, but withstand temperatures of 38°C-40°C and as low as 0°C for short periods [1]. Heavy rainfall places are not suitable for this crop, excessive rainfall cause flower drop and fruit drop [4]. Dragon Fruit can be grown on almost any soils however; the most ideal soil type is sandy loam soils with rich in organic matter and slightly acidic in nature (pH 5.5 to 6.5). Dragon fruit is well responsive to nutrient management. Vermicompost and Farm Yard Manure are better responsible than use single manure for affecting both quantitative as well as qualitative aspects of dragon fruit. But there is limited information available regarding its fertilizer management. However, it was found that it is well responsive to organic manures and natural resources. Keeping these facts in mind a field experimental was conducted at dragon fruit orchard to evaluate the integrated nutrient management in vegetative growth of dragon fruit plant in sub-tropical Lucknow condition.

MATERIALS AND METHODS

The experiment was carried out at dragon fruit orchard, Department of Horticulture, Babasaheb Bhimrao Ambedkar University, Lucknow (Uttar Pradesh), India (26°55′N latitudes and 80°54′E, 123 m above MSL) in the subtropical climate of central Uttar Pradesh) during 2021-22. Soil was sandy loam with uniform fertility having pH 8.2. There were 10 treatments (T_0-Control, T_1-Recommended dose fertilizer (RDF), T_2-75% RDF+1 kg Vermicompost/pole, T_3-50% RDF+2 kg Vermicompost/pole, T_4-25% RDF+3 kg Vermicompost/pole, T_5-0% RDF+4 kg Vermicompost/pole, T_6-75% RDF+4 kg FYM/pole, T_7-50% RDF+6 kg FYM/pole, T_8-25% RDF+8 kg FYM/pole, T_9-0% RDF+10 kg FYM/pole) laid out in RBD design with 3 replications. Vermicompost was purchased from Central Institute of Sub tropical Horticulture (ICAR-CISH), Lucknow and fully rotten FYM was procured from local village. The full dose of organic manure according to different treatment was applied at once at beginning of experiment. Inorganic fertilizers were applied in two split doses during November and February. Well-rotted FYM@4 kg, 6 kg, 8 kg, 10 kg, Vermicompost @ 1 kg, 2 kg, 3 kg, 4 kg and recommended dose of fertilizer @200 g N_2, 225 g P_2O_5, 137.5 g K_2O/pole [5] were applied in two split doses first during December 2021 and second during February 2022 (end of winter). Vegetative growth in terms of plant length, number of primary branches per plant, number of segments, number of areoles, stem girth, stem circumference, number of segment, distance of areoles and arch height were recorded as per standard methods [6]. The recorded data were analyzed statistically with the help of OPSTAT following RBD [7] and treatment means were compared at 5% level of significance.

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RESULTS

The highest (5.77 cm) increase of plant length at 45 DAT (from 30 days to 45 days) was recorded with T_6 (75% RDF+4 kg FYM) followed by 4.43 cm increase under T_5 (4 kg vermicompost) and minimum increase (0.37) cm was recorded in control (T_0) treatment (Table 1). Whereas, at 60 DAT, it was maximum (0.87 cm) with treatment T_1 (100% RDF) followed by T_3 and T_7. T_1 (100% RDF) also caused maximum increase at 75 DAT (from 60 days to 75 days) as well as at 90 DAT (0.87 cm 0.69 cm, respectively) followed T_2 (75%RDF+1 kg vermicomost). However, overall increase in plant length from 30 to 90 days was evaluated and found that maximum 7.43 cm increase was recorded with T_6 followed by T5 (5.57 cm).

T_6 treatment (75% RDF+4 kg FYM) also showed (Table 1) the maximum number of primary branches (7.67) at 45 DAT followed by treatment T_1 and T_8 (100% RDF and 25% RDF+8 kg FYM, respectively). Similar trend was seen at 60 DAT where, maximum branches were counted with T6 followed by T_1, T_4 and T_7. But, at 75 DAT number of primary branches per plant (5.33) was recorded maximum in T_5 (4 kg FYM) next by T_1 and T_6. Similarly, it was observed that after 90 DAT (from 75 to 90 days) the increase in number of primary branches per plant (4.00) was maximum in treatment T_4 (25% RDF+3 kg vermicompost) followed by T_2 (75% RDF+2 kg vermicomost). However, overall increase in number of primary branches per plant from 30 to 90 DAT was noted maximum (17.00) under treatment T_6 followed by 12.67 with T_4 and minimum (2.00) was recorded in treatment T_9.

In case of change in number of areoles per segment (Table 2), it was seen that very close increase was observed with T_5, T_6, T_8 at 45 DAT. However, at 60 DAT (from 45 days to 60 days) it was highest (27.00) with T_9 (10 kg FYM) followed by 21.67 increase in T_6 (75% RDF+4 kg FYM). Again, after 75 DAT it was observed maximum in T_0, T_3 and T_5 treatment. Maximum enhancement after 90 days (from 75 to 90 days) was found with T_6 followed by T_2, T_4, T_7, T_9. While, not increase was noticed in treatment T_0,T_2,T_3,T_5,T_8.

Overall total increase in number of areoles per segment from (30 to 90 DAT) was evaluated maximum in T_6 (75% RDF+4 kg FYM) (Table 2).

Table 3 showed that change of stem girth and circumference at various days due to different nutritional treatments. Maximum increase in stem girth (0.11 cm) at 45 days (from 30 days to 45 days) was recorded with T_1 treatment (75% RDF+1 kg vermicompost) followed by 0.10 cm increase in treatment T_3 and T_4 (50% RDF+2 kg vermicompost and 25% RDF+3 kg vermicompost, respectively). After 60 days maximum increase in stem girth (0.08 cm) was noticed in treatment T_6 followed by T_1, while treatment T_0, T_4, T_9 (control, 25% RDF+3 kg vermicompost, 10 kg FYM) showed minimum increase. But, T_8 showed maximum increase at 75 DAT followed by 0.10 cm increase in treatment T_1. At 90 DAT (from 75 to 90 days) the maximum increase in stem girth (0.37 cm) was noticed under the treatment T_1 (100% RDF), while, the treatmentT_0 and T_5 resulted minimum increase. Overall increase of stem girth from 30 to 90 DAT was estimated maximum (1.07 cm) under T_1 (100% RDF) followed by T6 and minimum increase (0.29 cm) was evaluated in treatment T_5.

Treatment T_1 (100% RDF) showed the maximum increase in areole distance (0.33 cm) followed by 0.11 cm increase in control (T_0) at 45 DAT (Table 4). At 60 DAT it was seen that progress in distance between areoles (0.12 cm) was noted maximum with T_1 (100% RDF) followed by T_2 and minimum increase (0.03) was under treatment T_7 (50% RDF+6 kg FYM). At 75 days (from 60 days to 75 days) it was found maximum in T6 followed by 0.22 cm increase in treatment T_2 while, the minimum (0.03) was result in T_0. Similar trend was observed at 90 DAT also showing maximum increase in T_6. T_6 also caused maximum overall total increase from 30 days to 90 days and minimum increase in distance between areoles (0.18 cm) was recorded in T_5.

TABLE 1

Effect of organic and inorganic fertilizer on increase of plant length and number of primary branches of dragon fruit

Treatment	Increase in plant length							Increase in primary branches						
	Plant length (cm) at 30 DAT	Increase at 45 DAT (cm)	Increase (cm) at 60 DAT	Increase (cm) at 75 DAT	Plant length (cm) at 90 DAT	Increase (cm) at 90 DAT	Total increase (cm) (from 30 – 90 days)	Number of primary branches/ plant at 30 DAT	Increase in primary branches/ plant at 45 DAT	Increase in primary branches/ plant at 60 DAT	Increase in primary branches/ plant at 75 DAT	Number of primary branches/ plant at 90 DAT	Increase in Primary branches /plant 90 DAT	Total increase from 30 -90 days
T_0	132.83	0.37	0.33	0.34	134.2	0.33	1.37	3	1.33	0.33	0.67	5.33	0	2.33
T_1	110.3	0.83	0.87	0.87	113.56	0.69	3.26	1.33	3.33	4	3.33	12	0	10.67
T_2	120.25	0.73	0.37	0.7	122.66	0.59	2.41	2.67	2.67	3	2	13.67	3.33	11
T_3	164.57	0.53	0.8	0.6	166.73	0.22	2.16	6.33	1.33	1	1	10	0.33	3.67
T_4	90.23	0.6	0.57	0.47	92.17	0.4	1.94	0.67	3	4	1.67	13.33	4	12.67
T_5	116.83	4.43	0.33	0.4	122.4	0.4	5.57	2	1	1.33	5.33	10	0.33	8
T_6	125.8	1.53	0.8	0.7	133.23	0.5	7.43	7.33	7.67	6	3.33	24.33	0	17
T_7	172.27	5.77	0.57	0.6	175.77	0.47	3.5	1.67	2.33	4	1.67	9.67	0	8
T_8	87.9	0.6	0.63	0.53	90.2	0.53	2.3	2	3.33	2.67	2.33	10.33	0	8.33
T_9	169.97	3.13	0.66	0.57	171.87	0.33	1.9	4	0.67	0.67	0.33	6	0.33	2
SEm(±)		1.218	0.091	0.066		0.091	1.239		1.81	1.511	1.404		1.712	2.982
CD(P=0.05)		3.648	0.272	0.199		NS	NS		NS	NS	NS		NS	8.928

Note: T_0-Control, T1-RDF (100%), T_2-75% RDF+1 kg Vermicompost, T_3-50% RDF+2 kg Vermicompost, T_4-25% RDF+3 kg Vermicompost, T_5-0 % RDF+4 kg Vermicompost, T_6-75% RDF+4 kg FYM, T_7-50 % RDF+6 kg FYM, T_8-25 % RDF+8 kg FYM, T_9-0 % RDF+10 kg FYM.

TABLE 2

Effect of integrated nutrient management on number of segments and number of areoles of dragon fruit

Treatment	Increase in number of segment							Increase in number of areoles						
	Number of segment/ plant at 30 DAT	Increase at 45 DAT	Increase at 60 DAT	Increase in at 75 DAT	Number of segment/ plant at 90 DAT	Increase at 90 DAT	Total increase from 30-90 days	Number of areoles/ segment at 30 DAT	Increase at 45 DAT	Increase at 60 DAT	Increase at 75 DAT	Number of areoles/ segment at 90 DAT	Increase at 90 DAT	Total increase from 30-90 days
T_0	5	0	0.33	0.67	5.67	0	0.67	13.33	0	0	0.67	14.67	0.33	1.33
T_1	4	0.33	4	3.33	5.33	0.33	1.33	18.33	0.33	0.67	0.33	20	0.33	1.67
T_2	3.67	0.67	3	2	4.67	0	1	13.33	0	0.67	0.33	14.33	0	1
T_3	4	0.33	1	1	4.67	0	0.67	14.33	0	0	0.67	15	0	0.67

T_4	2.33	0.33	4	1.67	3	0.33	0.67	12.33	0.67	0.33	0.33	14	0.33	1.67
T_5	3.33	0	1.33	5.33	3.67	0	0.33	18.33	0.67	0	0.67	19.67	0	1.33
T_6	4.33	1.33	6	3.33	6.33	0.33	2	20.67	0.33	0.67	0.33	22.67	0.67	2
T_7	3	0.33	4	1.67	4.67	0.67	1.67	14	0.33	0.33	0.33	15.33	0.33	1.33
T_8	4.67	0.67	2.67	2.33	6.67	0.67	2	9.33	0.67	0.67	0.33	11	0	1.67
T_9	3.67	0	0.67	0.33	3.67	0	0	26.33	0.33	0.33	0.33	27.67	0.33	1.33
SEm(±)		0.335	0.283	0.189		0.241	0.645		0.251	0.3	0.335		0.256	0.589
CD (P=0.05)		NS	NS	NS		NS	NS		NS	NS	NS		NS	NS

Note: T_0-Control, T_1-RDF (100%), T_2-75% RDF+1 kg Vermicompost, T_3-50% RDF+2 kg Vermicompost, T_4-25% RDF+3 kg Vermicompost, T_5-0 % RDF+4 kg Vermicompost, T_6-75% RDF+4 kg FYM, T_7-50 % RDF+6 kg FYM, T_8-25 % RDF+8 kg FYM, T_9-0 % RDF+10 kg FYM.

TABLE 3

Effect of integrated nutrient management on stem girth and stem circumference of dragon fruit

Treatment	Increase in plant length							Increase in primary branches						
	Plant length (cm) at 30 DAT	Increase at 45 DAT (cm)	Increase (cm) at 60 DAT	Increase (cm) at 75 DAT	Plant length (cm) at 90 DAT	Increase (cm) at 90 DAT	Total increase (cm) (from 30 – 90 days)	Number of primary branches/ plant at 30 DAT	Increase in primary branches/ plant at 45 DAT	Increase in primary branches/ plant at 60 DAT	Increase in primary branches/ plant at 75 DAT	Number of primary branches/ plant at 90 DAT	Increase in Primary branches /plant 90 DAT	Total increase from 30 -90 days
T_0	3.04	0.05	0.02	0.02	3.34	0.07	0.3	11.77	0.1	0.33	0.27	12.77	0.27	1
T_1	2.95	0.11	0.07	0.1	4.02	0.37	1.07	10.9	0.3	0.3	0.73	12.9	0.67	2
T_2	3.83	0.07	0.06	0.06	4.44	0.16	0.62	13.83	0.27	0.3	0.63	15.53	0.5	1.7
T_3	3.16	0.1	0.04	0.06	3.75	0.11	0.59	11.5	0.3	0.17	0.33	12.77	0.47	1.27
T_4	3.47	0.1	0.02	0.04	3.96	0.09	0.49	13.07	0.33	0.2	0.63	14.63	0.4	1.57
T_5	3.16	0.05	0.01	0.02	3.45	0.07	0.29	11.1	0.29	0.17	0.63	12.53	0.33	1.43
T_6	3.54	0.08	0.08	0.07	4.33	0.23	0.79	12.49	0.51	0.23	0.63	14.33	0.47	1.85
T_7	2.97	0.08	0.04	0.05	3.54	0.15	0.58	11.27	0.23	0.23	0.57	12.73	0.43	1.47
T_8	2.98	0.05	0.05	0.12	3.67	0.13	0.69	11.3	0.2	0.27	0.43	12.6	0.4	1.3
T_9	2.81	0.09	0.02	0.04	3.3	0.12	0.49	10.07	0.3	0.37	0.4	11.67	0.53	1.6
SEm (±)		0.08	0.04	0.06		0.03	0.12		0.08	0.04	0.1		0.09	0.17
CD(P=0.05)		NS	NS	NS		0.08	0.35							

Note: T_0-Control, T_1-RDF (100%), T_2-75% RDF+1 kg Vermicompost, T_3-50% RDF+2 kg Vermicompost, T_4-25% RDF+3 kg Vermicompost, T_5-0 % RDF+4 kg Vermicompost, T_6-75% RDF+4 kg FYM, T_7-50 % RDF+6 kg FYM, T_8-25 % RDF+8 kg FYM, T_9-0 % RDF+10 kg FYM.

TABLE 4

Effect of integrated nutrient management on number of spines and distance between areoles of dragon fruit

Treatment	Increase in plant length							Increase in primary branches						
	Plant length (cm) at 30 DAT	Increase at 45 DAT (cm)	Increase (cm) at 60 DAT	Increase (cm) at 75 DAT	Plant length (cm) at 90 DAT	Increase (cm) at 90 DAT	Total increase (cm) (from 30 – 90 days)	Number of primary branches/ plant at 30 DAT	Increase in primary branches/ plant at 45 DAT	Increase in primary branches/ plant at 60 DAT	Increase in primary branches/ plant at 75 DAT	Number of primary branches/ plant at 90 DAT	Increase in Primary branches /plant 90 DAT	Total increase from 30 -90 days
T_0	3.5	0.03	0.02	0.03	3.67	0.1	0.18	1.99	0.11	0.07	0.03	2.24	0.04	0.24
T_1	4.22	0.03	0.04	0.07	4.52	0.16	0.3	5.14	0.33	0.12	0.06	5.75	0.11	0.61
T_2	4.72	0.31	0.25	0.1	5.7	0.33	0.98	2.55	0.06	0.1	0.22	3.41	0.49	0.87
T_3	3.27	0.03	0.03	0.05	3.54	0.15	0.26	2.38	0.05	0.04	0.07	2.62	0.07	0.24
T_4	4.22	0.04	0.04	0.05	4.44	0.09	0.22	3	0.05	0.04	0.1	3.26	0.07	0.26
T_5	3.27	0.02	0.02	0.04	3.42	0.07	0.15	2.35	0.05	0.05	0.04	2.52	0.04	0.18
T_6	3.42	0.05	0.03	0.07	3.72	0.15	0.3	3.12	0.07	0.09	0.47	4.65	0.9	1.53
T_7	3.33	0.05	0.04	0.07	3.6	0.11	0.27	2.57	0.05	0.03	0.07	2.79	0.06	0.22
T_8	3.72	0.04	0.04	0.06	3.95	0.09	0.23	2	0.07	0.04	0.07	2.24	0.06	0.24
T_9	3.89	0.14	0.21	0.22	4.6	0.15	0.72	2.36	0.04	0.05	0.06	2.56	0.06	0.2
SEm(±)		0.07	0.05	0.02		0.05	0.143		0.05	0.02	0.046		0.08	0.134
CD (P=0.05)		NS	NS	0.05		NS	0.429		0.16	NS	0.139		0.24	0.402

Note: T_0-Control, T_1-RDF (100%), T2-75% RDF+1 kg Vermicompost, T_3-50% RDF+2 kg Vermicompost, T_4-25% RDF+3 kg Vermicompost, T_5-0 % RDF+4 kg Vermicompost, T_6-75% RDF+4 kg FYM, T_7-50 % RDF+6 kg FYM, T_8-25 % RDF+8 kg FYM, T9-0 % RDF+10 kg FYM.

Figure 1 presented that T_6 treatment also showed the maximum increase in arch height 45 DAT that was continued to 60 DAT. At 75 DAT highest increase was recorded in T_5 and T_8 treatment. But, T_6 again showed the highest increase at 90 DAT as well as in case of total increase from 30 to 90 DAT.

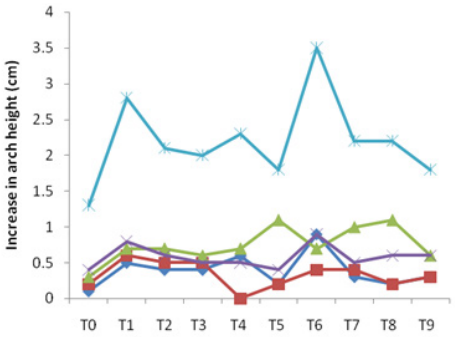

Figure 1) *Effect of integrated nutrient management on arch height in stem of of dragon fruit. Note: (—◆—) 45DAT, (—■—) 60 DAT, (—▲—) 75DAT, (—×—) 90 DAT, (—✳—) Total*

DISCUSSION

It is evident from the data presented in the preceding chapter that different treatment had significant effect on vegetative growth parameters *viz.* plant length, number of primary branches per plant, number of segment per plant, number of areoles per segment, Stem girth, Stem circumference, number of spines per areoles, distance between areoles and Arch height in dragon fruit from 30, 45, 60, 75 and 90 DAT after treatment during 2021-2022. The plant growth significantly increase due to organic and inorganic fertilizer treatment so that increase rate of the plant length, number of primary branches per plant, number of segment per plant, number of areoles per areoles per segment, Distance between areoles in T_6 showed the best result but in case of stem girth and stem circumference in treatment T_1 (RDF) showed the best result from 30 days to 90 days. The overall minimum increase of plant length (1.37 cm), stem circumference (1.00 cm), number of spines per areoles (0.18), and Arch height (1.3 cm) at 30 days to 90 days after treatment respectively in T_0 control and number of areoles per segment (0.67) in treatment T_3 and number of primary branches per plant (2.00 cm), number of segment per plant (0.33), stem girth (0.29 cm), distance between areoles (0.18 cm) in treatment T_5 respectively. The result of the present investigation indicated that plant growth was significantly affected by different levels of treatments. The higher increase in plant length, number of primary branches per plant, number of segment per plant, number of areoles per segment, Stem girth, Stem circumference, number of spines per areoles, Distance between areoles and Arch height were recorded due to application of 75% RDF+4 kg FYM) in T_6 and T_1 (RDF) treatment.

Rate of increase in vegetative growth got momentum at 75 days after treatment when there was a steady increase in temperature. This increase also might be due to the fact that before this stage nutrient was applied to the plant along with irrigation.

It has been observed that there was significant variation on total chlorophyll content (Figure 2). It was founded that maximum increase and minimum increase in treatment T_6 and T_0 respectively.

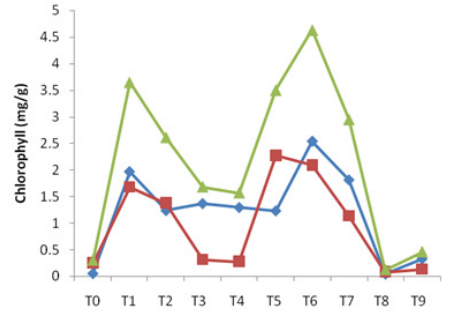

Figure 2) *Effect of integrated nutrient management on chlorophyll content in stem tissue of dragon fruit. Note: (—◆—) Chl a, (—■—) Chl b, (—▲—) Total*

Similar observation on improvement of vegetative growth was also seen by Herencia, et al. [8] in case of strawberry with the application of FYM and Vermicompost. In case of Chrysathemum, Warade, et al. [9] noticed that growth of vegetative parameters was improved by application of Vermicompost and FYM. Beneficial effects of organic composts were also stated by Maji [10] in dragon fruit. Reddy, et al. [11] also noted that improvement of vegetative growth of plant in terms of height, trunk girth and number of leaves per plant was seen by application of vermicompost and inorganic fertilizers in papaya [12].

CONCLUSION

On the basis of result obtained in the present investigation, it is clear that integrated use of chemical fertilizers and organic manures showed better vegetative growth in terms of stem length, production of more number of branches, increase in segmental length and number, distance between areoles as well as stem chlorophyll content. However, some growth parameters showed non-significant result as influenced by the various nutrition management practices. Among the various fertilizer management practices under present study, it can be concluded that application of organic manures along with inorganic fertilizer in the form of 75% Recommended Dose of Fertilizer+4 kg FYM per pole having 4 plants in each pole may be suggested for better vegetative growth of dragon fruit plants.

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