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Integrated nutrient management (INM) on growth and yield of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

HS Patel, NB Patel, JP Sarvaiya and SL Chawla

Abstract
The present experiment was conducted during summer season 2020 and 2021 at the Vegetable Research Farm, Regional Horticultural Research Station of the Navsari Agricultural University, Navsari, Gujarat, India. The experiment was conducted in randomized block design (RBD) with four replications, which included 8 treatments. Treatment (T_7) 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} was found better with respect to different growth and yield parameters likes days to first female flower (36.30 days), length of main vine at 60 DAS (199.50 cm) and final harvest (408.50 cm) and number of primary branches per vine at final harvest (18.68), length of fruit at 2nd harvest (37.05 cm), 3rd harvest (35.90 cm), 6th harvest (38.63 cm) and at 7th harvest (35.43 cm), girth of fruit at 2nd harvest (13.73 cm), 3rd harvest (15.43 cm), 6th harvest (14.28 cm) and at 7th harvest (13.70 cm), number of marketable fruits $plot^{-1}$ (67.13), average fruit weight (227.43g), total fruit yield (12.30 t ha^{-1}), marketable fruit yield (22.23 kg $plot^{-1}$), marketable fruit yield (11.12 t ha^{-1}) and total number of pickings (15.58) on pooled data basis.

Keywords: Ridge gourd, GARG-1, bio-compost, *Azotobacter*, PSB, growth, yield

Introduction
Amongst the various cucurbits Ridge gourd (*Luffa acutangula* L.) is one of the most important, which belongs to genus *Luffa*. Genus name derived from the product *"Loofah"* used as bathing sponges, scrubber pad, doormats, pillows, mattresses cleaning utensils etc. It is a vegetable of commercial importance and green immature fruits are cooked as vegetable. It is cultivated in India, Pakistan, Indonesia, China, Malaysia, Myanmar, Sri Lanka, Taiwan and Philippines. In India, it is largely grown in Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Maharashtra states. It is also known as *turiya* or even *turai* or *beerakai* or *dodka* in several languages in India.

Thus, in this respect integrated nutrient management (INM) plays a vital role to maintain soil fertility, to bring stability, sustainability in agricultural production and also avoid over dependence on chemical fertilizers. Efficient use of integrated plant nutrient supply system is a pre-requisite for achieving continuous advances in biological productivity of vegetable crops in ecologically sustainable manner (Sreenivas *et al.*, 2000) [18].

Farmyard manure is good source of organic matter enriched with most of the macronutrients like N (0.5%), P (0.2%) and K (0.5%) and little amount of minor nutrients. FYM not only provides plant nutrients but also improves the structure and aggregates of soil and it application in combination with inorganic fertilizers helpful to obtain good economic returns as well as providing favourable conditions for subsequent crops. Besides improving the fertilizer use efficiency and microbial activity it also increase water holding capacity, lower down the EC there by increasing phosphate availability and enhance soil porosity, reduce the nitrogen losses due to slowly degradation of organic matter (Yawalkar *et al.*, 2002) [21].

Bio-compost is a by-product of the sugar factory. It is made of pressmud, bagasses and ash which are composting with anaerobic bacteria for 45 days. It is considered as one of the best soil amendments that can be used as an alternative to commercial chemical fertilizers. It improves soil structure, soil fertility, texture, aeration, water holding capacity and stimulates healthy root development in plants.

Castor cake is concentrated organic manure which contains 4.3% N, 1.8% P_2O_5 and 1.3% K_2O. Decomposed castor cake makes nitrogen available to micro-organisms which help to increase the activity of FYM decomposition in soil providing organic N to crop in available from within growing season.

It provides nutrients for slow and steady nourishment of plant, protect from soil nematodes, increase yield and improve quality of the products (Reddy and Reddy, 2012) [15].
Though, the bio-fertilizers are not the substitute but serve as supplement to the chemical fertilizers for maximizing yield as well as to maintain balance in agro-ecosystem. *Azatobacter* is an important free living nitrogen fixer being used in vegetable crops which promotes growth and development of crops by helping in synthesis of auxins, vitamins, growth substances and antibiotics. The varying strains of phosphate solubilising bacteria (PSB) possess the ability to bring insoluble phosphate into soluble forms by secreting organic acids (Prasad *et al.*, 2009) [14].

Material and Methods

The present experiment was conducted during summer season 2020 and 2021 at the Vegetable Research Farm, Regional Horticultural Research Station of the Navsari Agricultural University, Navsari, Gujarat, India. The experiment was conducted in randomized block design (RBD) with four replications, which included 8 treatments namely, T_1: 100% Chemical fertilizer (100: 50: 50 N:P:K kg ha^{-1}), T_2: 100% RDF (10 t ha^{-1} FYM + 100: 50: 50 N:P:K kg ha^{-1}), T_3: RDF as per soil test + 5 t ha^{-1} FYM, T_4: RDF as per soil test + 2.5 t ha^{-1} Bio-compost, T_5: 75% RDF + 25% RDN from Bio-compost, T_6: 75% RDF + 25% RDN from Castor cake, T_7: 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} and T_8: Absolute control. Dose of organic manures (FYM, Bio-compost and castor cake**)** were applied based on the nitrogen content on dry weight basis at the time of sowing. Whereas, treatment having chemical fertilizers (Urea, SSP and MOP) used as a source of NPK. The full dose of phosphorus and potassium with half dose of nitrogen applied at the time of sowing and remaining half of nitrogen was applied as top dressing at 30 DAS. The *Azotobacter* and PSB, biofertilizers were mixed with bio-compost and applied.

Results and Discussion

The results obtained from the present investigation are summarized below

Days to first female flower

The results were found to be non-significant during both the years. In pooled analysis the result was found significant, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded minimum days to first female flower and was at par with the plants fed through T_1, T_2, T_3 and T_6. A maximum days to first female flower was recorded in the treatment of T_8 (Absolute control) in both the years as well as pooled data. It might be due to the better translocation of nutrients to the aerial parts of plant and enhancement toward reproductive phase due to the treatment consist relevant combination of organic and inorganic source of nutrient. In addition to these, *Azotobacter* and PSB like biofertilizer may be plays an important role to stimulate phosphorus and made available for reproductive organs to early initiation of flower. These findings are in the accordance with the result of Das *et al.* (2015) [3], Baghel *et al.* (2018) [2] in bottle gourd and Patel *et al.* (2018) [12] in bottle gourd.

Length of main vine (cm)

The length of main vine (cm) at 60 DAS and final harvest was found maximum length of main vine (cm) were recorded with the treatment T_7 and remain at par with the treatments T_1 and T_2 during both the years 2020 and 2021. In pooled analysis, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded the maximum length of main vine at 60 DAS and final harvest (cm) and was at par with treatment T_2. Minimum length of main vine (cm) at 60 DAS and final harvest was found in treatment of T_8 (Absolute control) in both the years as well as pooled data. It might be due to the application of organic manures along with biofertilizers was increased the soil aggregates and more porosity thus high aeration and water availability favored nutrient uptake. It was caused high rate of cell division and elongation as a better photosynthetic activity. Whereas, inorganic fertilizer resulted vegetative growth throughout season. The positive effect of integrated nutrient management on vegetative growth parameters obtained was correlated by the result of Patle *et al.* (2018) [13] in bottle gourd and Thriveni *et al.* (2015) [19] in bitter gourd.

Number of primary branches per vine at final harvest

During both the years as well as pooled analysis, the maximum numbers of primary branches per vine at final harvest were recorded with the treatment T_7 and was remained at par with the treatment T_2. Minimum number of primary branches per vine at final harvest was found in treatment of T_8 (Absolute control) in both the years as well as pooled data. This was might be happen due to organic manure degrade slowly and biofertilizers play role effectively in later stage and crop turned toward the branches due to acute shortage of nutrients at prior growth stage due to early fruit bears as against it fertilizer accelerate the main vine. These findings were in the accordance with the result of Kumar *et al* (2012) [9] in bottle gourd and Nayak *et al*. (2016) [11] in pointed gourd.

Table 1: Integrated nutrient management (INM) on different growth parameters of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

Treatments	Days to first female flower			Length of main vine (cm) at 60 DAS			Length of main vine (cm) at final harvest			Number of primary branches per vine at final harvest		
	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled
T_1	36.90	39.20	38.05	186.55	167.95	177.25	391.55	348.35	369.95	15.80	14.35	15.08
T_2	35.85	38.20	37.03	194.35	180.85	187.60	414.20	366.60	390.40	18.05	16.45	17.25
T_3	37.70	39.90	38.80	177.50	159.70	168.60	373.50	336.20	354.85	14.15	12.90	13.53
T_4	40.45	42.75	41.60	152.80	137.50	145.15	330.60	297.50	314.05	10.55	9.70	10.13
T_5	39.30	41.45	40.38	163.20	146.90	155.05	350.90	313.75	332.33	12.15	11.20	11.68
T_6	38.30	40.45	39.38	170.95	152.75	161.85	360.00	325.95	342.98	13.25	12.20	12.73
T_7	35.10	37.50	36.30	210.00	189.00	199.50	430.00	387.00	408.50	19.45	17.90	18.68
T_8	41.65	43.70	42.68	145.00	130.50	137.75	317.00	285.30	301.15	9.30	8.55	8.93
Year Mean	38.16	40.39	39.28	175.04	158.14	166.59	370.97	332.58	351.78	14.09	12.91	13.50
S.Em. ±	1.87	1.95	1.25	8.17	4.73	4.39	16.75	15.89	10.74	0.54	0.56	0.36
C.D. at 5%	NS	NS	3.57	24.04	13.91	12.50	49.25	46.72	30.54	1.58	1.65	1.04
S.Em.± (Y x T)			1.91			6.68			16.32			0.55

C.D. at 5% (Y x T)			NS			NS			NS			NS
C.V.%	9.82	9.68	9.75	9.34	5.98	8.02	9.03	9.55	9.28	7.64	8.69	8.15

Length of fruit (cm)

The results were found to be non-significant during both the years in length of fruit (cm) at 2nd and 3rd harvest. The maximum length of fruit (cm) at 6th and 7th harvest (cm) was achieved in the treatment T_7 which was more or less at par with the treatments T_1, T_2, T_3 T_5 and T_6 in both the years 2020 and 2021. With regard to the pooled mean, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded maximum length of fruit at 2nd, 3rd, 6th and 7th harvest. The length of fruit (cm) with the treatment T_1 and T_2 were remaining at par with 2nd, 3rd, 6th and 7th harvest. Minimum length of fruit at 2nd, 3rd, 6th and 7th harvest were recorded with treatment of T_8 (Absolute control) in both the years as well as pooled data. It was might be due to higher number of primary branches resulted early first and fifty per cent female flower under treatment received bio-compost along with fertilizer in ideal balanced proportion. Those had boosted the fruit length and girth by got synthesis greater amount of food material translocated into developed fruit after second harvest and that reflected in the mean fruit length and girth, too. Whereas, control treatment had least primary branches excreted late and little female flower thus, food material wasted for higher vegetative growth of main vine. The similar result was gave confirmation by Nagar *et al.* (2017) [10] in bottle gourd and Shree *et al.* (2018) [16] in bitter gourd.

Girth of fruit (cm)

The result was found to be non-significant during season 2021 on girth of fruit (cm) at 6th harvest. The higher value for girth of fruit (cm) at 2nd, 3rd, 6th and 7th harvest were registered with the treatment T_7 which was more or less at par with the treatments T_1, T_2, T_3, T_4, T_5 & T_6 during both the years study. In pooled analysis, application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded maximum girth of fruit at 2nd, 3rd, 6th and 7th harvest. The girth of fruit (cm) with the treatment T_1 and T_2 were remaining at par with 2nd, 3rd, 6th and 7th harvest. Minimum girth of fruit at 2nd, 3rd, 6th and 7th harvest were recorded with treatment of T_8 (Absolute control) in both the years as well as pooled data. The similar result was gave confirmation by Nagar *et al.* (2017) [10] and Shree *et al.* (2018) [16].

Number of marketable fruits $plot^{-1}$

During the years of 2020 and 2021, the number of fruits per plot was found the maximum number of fruits per plot was recorded with the treatment and was remained at par with the treatment T_1 and T_2. In pooled analysis, application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded the maximum number of fruits $plot^{-1}$ and at par with T_2. Minimum number of fruits $plot^{-1}$ was recorded with treatment of T_8 (Absolute control) in both the years as well as pooled data. This was might be due to integrated used of organics, inorganic with bio fertilizer in a balance ratio synthesis more food materials in leaves through high photosynthetic process with advancement of season by the bio-compost. This food materials generated more primary branches bared added much more female flowers which nourished all as a result higher number of fruits harvested from same treatment. The similar results narrated by Kumar and Karuppaiah (2008) [8] in bitter gourd, Dash *et al.* (2018) [4] in cucumber and Singh *et al.* (2018) [17] in cucumber.

Average fruit weight (g)

The results were found to be non-significant during both the years. An analysis of the pooled mean data showed that average fruit weight was found maximum (g) in treatment (T_7). Minimum average fruit weight (g) was found in T_8 (Absolute control) in both the years as well as pooled data. It might be due to availability of essential plant nutrients and more balanced C:N ratio from bio-compost and bio fertilizers like *Azotobacter* and PSB which might have increased the synthesis of carbohydrates. It was tune to increase fruit girth and thereby average fruit weight. These results were in conformity with the findings of Eifediyi and Remison (2010) [5] in cucumber and Anjanappa *et al.* (2012) [1] in cucumber.

Marketable fruit yield (kg ha^{-1})

During the both the years 2020 and 2021, the maximum marketable fruit yield (kg $plot^{-1}$) was recorded with the treatment T_7 and was remained at par with the treatment T_2. In pooled analysis, application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded significantly the maximum marketable fruit yield (kg $plot^{-1}$). Minimum marketable fruit yield (kg $plot^{-1}$) was found in treatment T_8 (Absolute control) in both the years as well as pooled data. This was might be due to biofertilizers actively converted nutrients in to available form right from application around the root rhizosphere. Additionally, favorable soil condition caused by organic manures like bio-compost to high uptake of N, P and K as well micro nutrients. Among the organics, bio-compost improves soil status and biological properties significant over other manures. Ultimately, this treatment turned out primary branches, which produced early first female flower and it also noted for fifty per cent flowering. Thus, higher number of fruit set and retained cumulatively ended with more yield per plant. Contradictory, fertilizer treatment exhibited more vegetative growth even in later stage and less number of fruit setting. In this study was confirmed by Thriveni *et al.* (2017) [20] in bitter gourd, Singh *et al.* (2018) [17] in cucumber and Ghosh *et al.* (2016) [7] in water melon.

Total fruit yield (t ha^{-1})

The total fruit yield (t ha^{-1}) the maximum was recorded with the treatment T_7 and was statistically at par with the treatment T_2 in the years 2020 and 2021. In pooled analysis, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded the higher total fruit yield (t ha^{-1}). Minimum total fruit yield (kg $plot^{-1}$) was found in treatment T_8 (Absolute control) in both the years as well as pooled data. In this study was confirmed by Thriveni *et al.* (2017) [20] in bitter gourd, Singh *et al.* (2018) [17] in cucumber and Ghosh *et al.* (2016) [7] in water melon.

Table 2: Integrated nutrient management (INM) on length of fruit (cm) of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

Treatments	Length of fruit (cm) at 2nd harvest			Length of fruit (cm) at 3rd harvest			Length of fruit (cm) at 6th harvest			Length of fruit (cm) at 7th harvest		
	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled
T_1	36.35	33.40	34.88	34.80	32.35	33.58	37.35	33.70	35.53	34.25	31.65	32.95
T_2	37.70	34.70	36.20	36.05	33.50	34.78	38.85	35.60	37.23	35.70	32.70	34.20
T_3	35.40	32.60	34.00	33.80	31.45	32.63	35.60	32.60	34.10	33.00	30.45	31.73
T_4	33.15	30.50	31.83	31.05	29.45	30.25	32.80	29.30	31.05	30.30	27.90	29.10
T_5	34.20	31.40	32.80	32.15	30.35	31.25	34.15	30.70	32.43	31.50	28.95	30.23
T_6	34.80	32.00	33.40	32.95	30.90	31.93	35.15	31.60	33.38	32.40	29.65	31.03
T_7	38.60	35.50	37.05	37.35	34.45	35.90	40.25	37.00	38.63	36.90	33.95	35.43
T_8	32.40	29.80	31.10	30.20	28.80	29.50	31.75	28.30	30.03	29.45	27.05	28.25
Year Mean	35.33	32.49	33.91	33.54	31.41	32.48	35.74	32.35	34.04	32.94	30.29	31.61
S.Em. ±	1.75	1.85	1.17	1.57	1.35	0.96	1.75	1.37	1.03	1.48	1.39	0.94
C.D. at 5%	NS	NS	3.36	NS	NS	2.74	5.14	4.02	2.92	4.35	4.08	2.67
S.Em.± (Y x T)			1.80			1.46			1.57			1.43
C.D. at 5% (Y x T)			NS			NS			NS			NS
C.V.%	9.93	11.37	10.63	9.35	8.61	9.02	9.78	8.45	9.22	8.97	9.15	9.06

Table 3: Integrated nutrient management (INM) on girth of fruit (cm) of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

Treatments	Girth of fruit (cm) at 2nd harvest			Girth of fruit (cm) at 3rd harvest			Girth of fruit (cm) at 6th harvest			Girth of fruit (cm) at 7th harvest		
	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled
T_1	13.40	12.40	12.90	14.70	13.85	14.28	13.85	13.10	13.48	12.80	12.00	12.40
T_2	13.80	12.90	13.35	15.45	14.40	14.93	14.25	13.55	13.90	13.50	12.70	13.10
T_3	12.75	11.95	12.35	14.10	13.25	13.68	13.40	12.80	13.10	12.30	11.45	11.88
T_4	11.60	10.95	11.28	12.95	12.15	12.55	12.30	12.10	12.20	10.95	10.35	10.65
T_5	12.05	11.45	11.75	13.45	12.65	13.05	12.70	12.45	12.58	11.45	10.85	11.15
T_6	12.30	11.60	11.95	13.80	13.10	13.45	13.05	12.60	12.83	11.85	11.10	11.48
T_7	14.15	13.30	13.73	15.90	14.95	15.43	14.75	13.80	14.28	14.15	13.25	13.70
T_8	11.30	10.65	10.98	12.50	11.70	12.10	11.95	11.80	11.88	10.50	9.90	10.20
Year Mean	12.67	11.90	12.28	14.11	13.26	13.68	13.28	12.78	13.03	12.19	11.45	11.82
S.Em. ±	0.56	0.44	0.33	0.57	0.65	0.40	0.52	0.60	0.37	0.52	0.42	0.31
C.D. at 5%	1.65	1.29	0.94	1.69	1.92	1.15	1.52	NS	1.05	1.54	1.22	0.88
S.Em.± (Y x T)			0.50			0.61			0.56			0.47
C.D. at 5% (Y x T)			NS			NS			NS			NS
C.V.%	8.85	7.38	8.20	8.14	9.84	8.98	7.77	9.40	8.59	8.59	7.27	8.00

Table 4: Integrated nutrient management (INM) on different yield parameters of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

Treatments	Number of fruits per plot			Average fruit weight (g)			Marketable fruit yield (kg plot^{-1})		
	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled
T_1	61.85	59.20	60.53	225.00	205.70	215.35	19.28	17.13	18.20
T_2	65.50	62.55	64.03	232.25	212.55	222.40	21.70	19.97	20.84
T_3	58.95	56.70	57.83	219.85	200.95	210.40	17.09	15.17	16.13
T_4	52.35	49.70	51.03	208.10	187.85	197.98	12.73	11.46	12.09
T_5	55.35	52.65	54.00	212.65	193.35	203.00	14.67	12.99	13.83
T_6	57.85	54.85	56.35	217.25	196.15	206.70	15.64	14.51	15.08
T_7	68.40	65.85	67.13	236.75	218.10	227.43	23.40	21.06	22.23
T_8	50.15	47.50	48.83	204.15	183.75	193.95	11.27	10.15	10.71
Year Mean	58.80	56.13	57.46	219.50	199.80	209.65	16.97	15.31	16.14
S.Em. ±	2.52	2.18	1.54	9.78	8.45	5.99	0.79	0.56	0.46
C.D. at 5%	7.41	6.42	4.39	NS	NS	17.02	2.33	1.65	1.30
S.Em.± (Y x T)			2.36			9.14			0.69
C.D. at 5% (Y x T)			NS			NS			NS
C.V.%	8.57	7.77	8.20	8.91	8.46	8.72	9.35	7.35	8.52

Table 5: Integrated nutrient management (INM) on different yield parameters of ridge gourd (*Luffa acutangula* L.) cv. GARG-1

Treatments	Total fruit yield (t ha^{-1})			Marketable fruit yield (t ha^{-1})			Total number of pickings		
	2020	2021	Pooled	2020	2021	Pooled	2020	2021	Pooled
T_1	10.87	9.88	10.37	9.64	8.57	9.10	14.50	13.15	13.83
T_2	12.03	11.25	11.64	10.85	9.98	10.42	15.55	13.90	14.73
T_3	9.81	8.92	9.37	8.55	7.58	8.07	13.80	12.35	13.08
T_4	7.77	7.19	7.48	6.36	5.73	6.05	11.85	10.65	11.25
T_5	8.71	7.91	8.31	7.33	6.49	6.91	12.65	11.45	12.05
T_6	9.14	8.63	8.89	7.82	7.26	7.54	13.35	11.75	12.55
T_7	12.84	11.76	12.30	11.70	10.53	11.12	16.35	14.80	15.58
T_8	7.12	6.60	6.86	5.64	5.08	5.36	11.20	10.10	10.65

Year Mean	9.79	9.02	9.40	8.49	7.65	8.07	13.66	12.27	12.96
S.Em. ±	0.40	0.27	0.23	0.40	0.28	0.23	0.66	0.61	0.42
C.D. at 5%	1.16	0.80	0.64	1.17	0.83	0.65	1.93	1.80	1.19
S.Em.± (Y x T)			0.34			0.34			0.64
C.D. at 5% (Y x T)			NS			NS			NS
C.V.%	8.09	6.06	7.23	9.35	7.35	8.52	9.63	9.98	9.80

Marketable fruit yield (t ha^{-1})

The maximum marketable fruit yield (t ha^{-1}) was recorded with the treatment T_7 and was remained at par with the treatment T_2 during both the years 2020 and 2021. In pooled analysis, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded significantly maximum marketable fruit yield (t ha^{-1}). Minimum marketable fruit yield (kg plot^{-1}) was found in treatment T_8 (Absolute control) in both the years as well as pooled data. In this study was confirmed by Thriveni *et al.* (2017) [20] in bitter gourd, Singh *et al.* (2018) [17] in cucumber and Ghosh *et al.* (2016) [7] in water melon.

Total number of pickings

The maximum total number of pickings was recorded with the treatment T_7 and was remained at par with the treatment T_1 and T_2 in both the years 2020 and 2021. In pooled analysis, Application of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} (T_7) recorded the maximum total number of pickings and was at par with the treatment T_2. Minimum total number of pickings was found in treatment T_8. This was might be due to integrated used of organics, inorganic with bio fertilizer in a balance ratio synthesis more food materials in leaves through high photosynthetic process with advancement of season by the bio-compost. This food materials generated more primary branches bared added much more female flowers which nourished all as a result higher number of fruits harvested from same treatment. The similar results narrated by Das *et al.* (2015) [3] in bottle gourd, Shree *et al.* (2018) [16] in bitter gourd and Singh *et al.* (2018) [17] in cucumber.

Conclusion

From the results of two years as well as pooled data study, it was inferred that for securing maximum growth and yield of ridge gourd cv. GARG-1, it is advisable to apply of 50% RDF + 25% RDN from Bio-compost + *Azotobacter* 2.5 l ha^{-1} + PSB 2.5 l ha^{-1} under South Gujarat Agro-climatic conditions. These results however need to be further confirmed on multi-location large scale trials before passing as recommendations to the ridge gourd growers of South Gujarat.

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