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Growth, yield and quality parameters of little gourd (*Coccinia grandis* L.) influenced by nutrient sources

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Abstract
The present investigation entitled, "Growth, yield and quality parameters of little gourd (*Coccinia grandis* L.) influenced by nutrient sources" was conducted at Department of Vegetable Science, Dr. Balasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli with various combinations of organic and inorganic treatments to study the growth, yield and yield contributing characters in little gourd and to find out optimum combination of nutrient resources for yield maximization in little gourd. Total ten treatments were studied in Randomized Block Design with three replications. Out of these ten treatments, an application of 50% RDF + vermicompost @5t/ha + Azotobacter @5kg/ha + PSB @5kg/ha had beneficial effect on days required for flowering from pruning (36.76 days), total number of fruits per plant (995.21), weight of fruit (8.22 g), total yield per plant (7 kg), total yield per hectare (16.98 tonnes) and B:C ratio (1.96).

Keywords: Little gourd, vermicompost, neem cake, azotobacter, PSB, yield and quality

Introduction
Little gourd (*Coccinia grandis* L.) is also known as ivy gourd and is perennial cucurbitaceous vegetable grown in southern, eastern and western states of India. The tender fruits are used as cooked vegetable. Tender green fruits are good source of protein, carbohydrate, calcium, fibre and vitamin A. (Khatun *et al*., 2012) [1]. The whole plant is traditionally used for medicinal properties. It helps in regulating body temperature during fever, juice from leaves and roots to cure diabetes. It is semi-perennial cucurbits with a duration of 3-4 years. It is dioecious plant producing parthenocarpy fruits.

Little gourd is a warm season vegetable crop. Konkan region is with warm and humid climatic conditions having high rainfall from June to September is ideal for cultivation of little gourd. Nowadays, it has gained commercial importance in big cities of Maharashtra. In Northen part of the Konkan is commercially grown during summer season after harvesting of rice.

However, no much attention has been paid towards improving productivity through best management practices. It has been observed that Nutrient plays significant role in the development of fruits and yield of little gourd. Nitrogen is absorbed by plants in large quantity and it is most influencing factor for crop production. The application of organic source supplies nitrogen, phosphorus, potash and other micro-nutrient in trace quantity. Under such condition, balanced nitrogen and other nutrients are highly imperative to obtain higher yield Patel *et al*. (2014) [6]. Biofertilizers when applied to soil, colonize the rhizosphere or interior of plant and promote growth by increasing availability of nutrients to plant. It is an important component of plant nutrient management for sustainable agriculture.

To improve the growth and yield, the present investigation entitled "Growth, yield and quality parameters of little gourd (*Coccinia grandis* L.) influenced by nutrient sources" was undertaken with the objectives, to study the growth, yield and yield contributing characters of little gourd and to find out optimum combination of nutrient resources for yield maximization of little gourd.

Materials and Methods
The experiment was conducted at Department of Vegetable Science, Dr. Balasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli. The experiment was laid out in Randomized Block Design with ten treatments and three replications. The treatments consisted of different nutrient sources along with the biofertilizers and organic manures. The treatment combinations

are as follows, T_1- FYM @ 10 t/ha + RDF (100:50:50 kg NPK/ha), T_2- 50% RDF + Azotobacter @ 5kg/ha + PSB @5kg/ha, T_3- Vermicompost @ 10t/ha, T_4- Vermicompost @10t/ha + Azotobacter @ 5kg/ha + PSB @ 5kg/ha, T_5- 50% RDF + Vermicompost @5t/ha, T_6- 50% RDF + Vermicompost @5t/ha + Azotobacter @ 5kg/ha + PSB @5kg/ha, T_7- Neem cake @10t/ha, T_8- Neem cake @ 10t/ha + Azotobacter @5kg/ha + PSB @5kg/ha, T_9- 50% RDF + Neem cake @5t/ha, T_{10}- 50% RDF + Neem cake @ 5t/ha + Azotobacter @5kg/ha + PSB @5kg/ha. These fertilizers were applied into four splits at one month interval. The observations *viz.*, growth parameters, yield attributing parameters and yield, were recorded. The data were statistically analysed by the method suggested by Panse and Sukhatme (1995) [5].

Results and Discussion

The data tabulated in Table 1 recorded significant difference in days taken for flowering among the different treatments. Earliest flowering observed in T_2 *i.e.*, 50% RDF + Azotobacter @5kg/ha + PSB @5kg/ha (36.76 days) which was at par with the treatments T_5 (36.78 days), T_6 (37.33 days), T_1 (38.11 days) and T_7 (38.49 days). Thus, all treatments were significantly varied for days required for flowering from pruning. Early flowering might be due to use of inorganic fertilizer and biofertilizers, which helped to increase production of growth promoting substance like GA_3 and IAA (Meena *et al*., 2019) [2]. Similar results were also reported by Mishra (2010) [3], Singh *et al*. (2018) [7] and Nikam *et al*. (2023) [4].

The data tabulated in Table 1 showed that weight of fruit significantly affected by various nutrient treatments. The highest weight of fruit (8.22 g) was observed in T_6 *i.e.*, 50% RDF + Vermicompost @10t/ha + Azotobacter @5kg/ha + PSB @5kg/ha which was at par with T_5 (8.18 g), T_9 (7.88 g) and T_1(7.86 g). The above results were confirmation with Singh *et al*. (2018) [7], Meena *et al*. (2019) [2].

Total number of fruits per plant was also significantly varied with various nutrient sources. The highest total number of fruits per plant recorded in the treatment T_6 (995.21) *i.e.*, 50% RDF + Vermicompost @10t/ha + Azotobacter @5kg/ha + PSB @5kg/ha which was at par with the treatments T_5 (923.67), T_1 (906.17), T_8 (864.10) and T_3 (861.19). Total number of fruits was significantly the highest in the treatment T_6 *i.e.*, 50% RDF + Vermicompost @10t/ha + Azotobacter @5kg/ha + PSB @5kg/ha might be due to balanced nutrition, better uptake of nutrients by the plants which helped in increasing fruit yield. Similar results were also reported by Nikam *et al*., 2023 [4]

Significantly, the highest yield per plant and yield per hectare was recorded in T_6 (7.00 kg) and (16.98 t) respectively *i.e.*, 50% RDF + Vermicompost @10t/ha + Azotobacter @5kg/ha + PSB @5kg/ha which was at par with the treatment T_5 (Fig.1). While studying the different yield contributing characters influenced by different nutrient sources in little gourd, it was observed that the treatment T_6 *i.e.*, 50% RDF + Vermicompost @5t/ha + Azotobacter@ 5kg/ha + PSB@ 5kg/ha showed promising result in relation to earliest flowering, highest fruit weight, number of fruits per plant. Thus, ultimately it resulted into the highest yield per plant and per hectare.

Table 1: Effect of nutrient sources on yield contributing characters and yield of little gourd

Treatments	Days required for flowering from pruning	Fruit weight (g)	Total no. of fruits plant^{-1}	Total yield plant $^{-1}$ (kg)	Total yield hectare $^{-1}$ (t)
T_1	38.11	7.86	906.17	5.91	14.32
T_2	36.76	7.61	693.21	4.26	10.33
T_3	39.33	7.78	861.19	5.12	12.41
T_4	39.33	7.63	740.70	4.43	10.73
T_5	36.78	8.18	923.67	6.45	15.63
T_6	37.33	8.22	995.21	7.00	16.98
T_7	38.49	7.40	843.32	4.87	11.80
T_8	41.89	6.69	864.10	4.53	10.97
T_9	42.51	7.88	839.28	4.59	11.13
T_{10}	41.44	7.64	846.58	4.74	11.50
F test	Sig	Sig	Sig	Sig	Sig
S.E m±	0.67	0.13	49.87	0.16	0.40
CD at 5%	1.99	0.38	148.16	0.49	1.20

Table 2: Comparative cost of cultivation as affected by nutrient sources in little gourd

Treatments	Total cost of cultivation (Rs.)	Yield (t/ha)	Selling prize per kg * (Rs.)	Gross income (Rs.)	Net income (Rs.)	B:C ratio
T_1	2,41,955	14.32	30	429600	1,87,645	1.78
T_2	1,96,063	10.33	35	361550	1,65,487	1.84
T_3	3,33,110	12.41	40	496400	1,63,290	1.49
T_4	3,25,110	10.73	40	429200	1,04,090	1.32
T_5	2,91,688	15.63	35	547050	2,55,362	1.88
T_6	3,02,626	16.98	35	594300	2,91,674	1.96
T_7	3,99,298	11.80	40	472000	72,702	1.18
T_8	3,96,610	10.97	40	438800	42,190	1.11
T_9	2,98,563	11.13	35	389550	90,987	1.30
T_{10}	3,03,376	11.50	35	402500	99,124	1.33

*- Treatments consisting only organic sources (T_3, T_4, T_7 and T_8) have selling prize of Rs. 40, treatments with combination of RDF and organic sources (T_2, T_5, T_6, T_9 and T_{10}) have selling prize of Rs. 35 and the treatment having only RDF (T_1) have selling prize of Rs. 30.

The data regarding cost of cultivation in little gourd are presented in Table 2. It was observed that the treatment T_6 *i.e.*, 50% RDF + Vermicompost @5t/ha + Azotobacter @5kg/ha + PSB @5kg/ha recorded the highest benefit cost ratio (1.96) followed by the treatment T_5 *i.e.*, 50% RDF + Vermicompost @5t/ha (1.88).

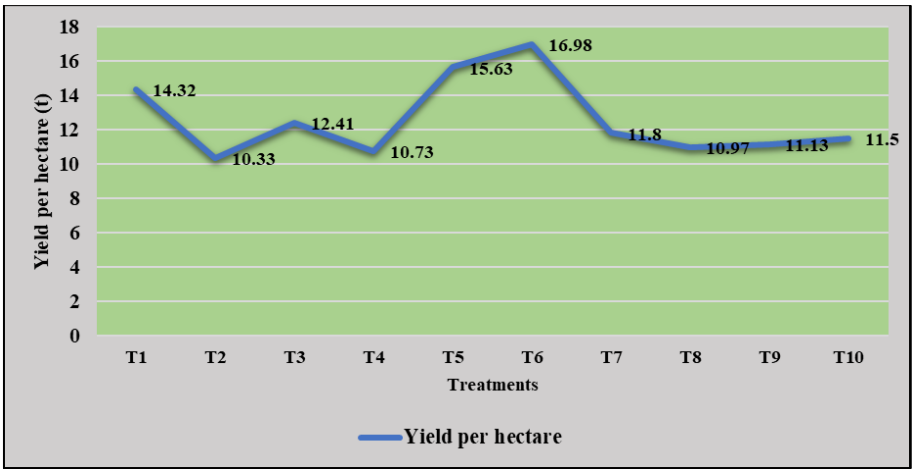

Fig 1: Effect of various nutrient sources on yield per hectare in little gourd (*Coccinia grandis* L.)

Plate 1: General view of experimental plot

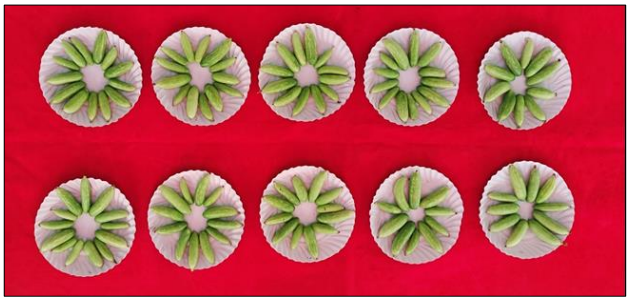

Plate 2: Effect of various nutrient sources on physical properties of little gourd

Conclusion

On the basis of results obtained, it was concluded that the treatment T_6 *i.e.*, 50% RDF + Vermicompost @5t/ha + Azotobacter @5kg/ha + PSB @5kg/ha is the best for the yield maximization of little gourd (*Coccinia grandis* L.) under Konkan agroclimatic conditions and it was followed by T_5 *i.e.*, 50% RDF + Vermicompost @5t/ha.

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