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Response of snake gourd to integrated nutrient management in lateritic soils of konkan region

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Abstract
A field experiment entitled "Response of Snake Gourd to Integrated Nutrient Management in Lateritic Soils of Konkan Region" laid out in Randomized Block Design comprising eleven treatment combinations replicated thrice, at Vegetable Improvement Scheme, Central Experiment Station, Wakawali, Dr. B.S.K.K.V., Dapoli, Dist. Ratnagiri during the *kharif* season of 2016. The effect of integrated nutrient management including vermicompost and poultry manure either alone or in combinations with inorganic fertilizers on growth attributing character of snake gourd were studied.
The application of 50 per cent N through poultry manure + 50 per cent N through inorganic fertilizers T_6 significantly influenced on growth attributing character *viz* Fruit yield, Weight of fruit, Fruit per vine and Fruit length of snake gourd. The application of 50 per cent N through poultry manure + 50 per cent N through inorganic fertilizer was found to be suitable for snake gourd in lateritic soil of Konkan.

Keywords: poultry manure, vermicompost, snake gourd and yield

1. Introduction
Snake gourd (*Trichosanthes anguina* L.) is an annual vegetable crop, climbing vine, providing both long and short fruits. India is a native home of Snake gourd. Vegetables are important in maintaining satisfactory nutritional level in human diet. There will be increasing demand for this commodity with accelerated industrial growth and increasing urban area. Vegetables are not only important source of vitamins and minerals but they can also help in improving economic condition of farmer.
Lateritic soil is best suited for cultivation of cucurbitaceous family crop (Ghayal, 2016) [8]. The traditional method of farming and less use of organic manure reduces the quality of Snake gourd. For increasing the productivity an economical fertilizer package need to be formulated which can provide all the essential elements through both organic and inorganic sources to get good quality, produce with higher production, keeping the production cost at sustainable level of an average farmer.
Intensive use of only chemical fertilizers to achieve high production has created various problems. Continuous application of heavy doses of chemical fertilizers without organic manures has led to deterioration of soil health in terms of physical and chemical properties of soil, decrease in soil microbial activities, and also reduction in soil humus (Anjanappa *et al*., 2011) [3].
Intensive cultivation and improper fertilizer use leads to deficiency of nutrients, thus resulting in lower yield of crops. Therefore, the use of farm input in the form of organic manure has become necessary. Though manures are usually very bulky and the cost of transportation is high but are safe sources of nutrition as they are environmental friendly, release their nutrients in a slow and steady manner to crop in the field thereby activating soil microbial activities (Eifediyi and Remison, 2010) [2]. Organic manure sustains cropping systems through better nutrient recycling and improvement in soil physical, chemical and biological properties. The use of organic manures has been observed to have beneficial effect on soil texture and structure (Hamma *et al*., 2012) [5].

2. Material and Methods
A field experiment on Response of Snake Gourd to Integrated Nutrient Management in Lateritic Soils of Konkan Region Cv. "Kokan shweta" was conducted at Vegetable Improvement Scheme, Central Experiment Station, Wakawali during the *Kharif*, 2016.

The experimental soil was moderately acidic is reaction (pH 5.62), high in organic carbon (15.9 g kg^{-1}), medium available nitrogen (266.62 kg ha^{-1}), low available phosphorus (6.87) and high available potassium (289.49 kg ha^{-1}). The experiment was laid out in Randomized block design with three replications. There were eleven treatments comprised of sources of organic and inorganic fertilizers. The treatment details are: control (T_1), RDF (100:50:50 NPK Kg ha^{-1}) through inorganic fertilizers (T_2), 25 % N through VC + 75 % N through inorganic fertilizer (T_3), 25 % N through P.M + 75 % N through inorganic fertilizer (T_4), 50 % N through VC + 50 % N through inorganic fertilizer (T_5), 50 % N through P.M + 50 % N through inorganic fertilizer (T_6), 75 % N through VC + 25 % N through inorganic fertilizer (T_7), 75 % N through P.M + 25 % N through inorganic fertilizer (T_8), 100 % N through VC (T_9), 100 % N through P.M (T_{10}), 50 % N through VC + 50 % N through P.M (T_{11}). The full quantity of poultry manure, vermicompost, P_2O_5 in the form of single super phosphate and K_2O in the form of muriate of potash were applied at time of sowing. The nitrogen was applied in two splits viz. at the sowing and after 30 days of sowing. The seed of snake gourd were dibbled at the rate of 2-3 seed per hill at spacing of 1.5 m ×0.5 m. thinning and gap filling were carried out at 20 days after sowing in order to have one healthy plant per hill. The observations regarding yield, weight of fruit, length of fruit, fruit per vine and nutrient content were taken and data were analyzed statistically as described Panse and Sukhatmate (1967) [1].

3. Results and Discussions

3.1 Effect of integrated nutrient management on yield attributing characters of Snake gourd

3.1.1 Fruit yield (t ha^{-1})

It is evident from the data presented in table 1 that the fruit yield was varied significantly from 10.95 to 19.82 t ha^{-1}. The treatment T_6 i.e. 50% Nitrogen through poultry manure + 50% Nitrogen through inorganic fertilizer produced higher fruit yield over all treatments except treatments T_5, T_7 and T_8 than the treatment T_1 (Control) and T_2 (recommended fertilizer dose), respectively. The increase in yield of snake gourd due to the presence of more per cent of N in poultry manure than the other organic manures i.e. vermicompost. Haque *et al.* (2014) [6]. Similarly, finding these result Dodake (2015) also reported that the highest fruit yield with 50% RDF + 50% poultry manure in snake gourd, ridge gourd and bitter gourd, respectively.

3.1.2 Fruit weight (kg)

The weight of fruit ranged from 13.14 to 23.79 kg per plot. The treatment T_6 i.e. 50% Nitrogen through poultry manure + 50% Nitrogen through inorganic fertilizer produced higher fruit yield over all treatments except treatments T_5, T_7 and T_8. Similar findings were also reported by with 50% RDF plus 50% poultry manure in ridge gourd and Haque *et al.* (2014) [6] in ridge gourd and snake gourd.

3.1.3 Length of fruit (cm)

From the perusal of the data presented in Table 1, it is evident that the length of fruit varied from 67.74 to 87.30 cm. The treatment T_6 were 50% Nitrogen through poultry manure + 50% Nitrogen through inorganic fertilizer was applied and showed significantly higher length of fruit than other treatments.

3.1.4 Fruit per vine

The data pertaining to the fruit are presented in Table 1 revealed that the highest fruit per vine 12.67 was recorded in treatment T_6 receiving 50% Nitrogen through poultry manure + 50% Nitrogen through inorganic fertilizer exhibited higher over all the treatments except treatment T_2. Similar findings were also reported by with 50% RDF plus 50% poultry manure in ridge gourd and Haque *et al.* (2014) [6] in ridge gourd and snake gourd.

3.1.5 Fruits per vine

The data presented in Table 1 revealed that the number of fruits per vine significantly varied between 8.67 and 12.67. A critical look on data further showed that treatment T_6 receiving equal integration of 50 per cent N through poultry manure + 50 N per cent through inorganic fertilizer recorded highest number of fruits per vine (12.67) over remained all the treatments except treatment T_2 where found to be statistically at par with T_6 and recommended dose of NPK fertilizer was applied.

Table 1: Effect of integrated nutrient management on yield attributing characters of snake gourd

Tr. No.	Treatments	Fruit yield kg ha^{-1}	Weight of fruit per plot (kg)	Fruit per vine	Length of fruit (cm)
T_1	Control	10.95	13.14	8.67	67.74
T_2	RDF 100:50:50 NPK Kg ha^{-1}	16.78	20.14	11.93	72.56
T_3	25 % N (V.C) + 75 % N inorganic fertilizer	16.18	19.41	9.87	72.53
T_4	25 % N (P.M) + 75 % N inorganic fertilizer	16.36	19.63	10.40	73.32
T_5	50 % N (V.C) + 50 % N inorganic fertilizer	19.58	23.50	10.73	84.47
T_6	50 % N (P.M) + 50% N inorganic fertilizer	19.82	23.79	12.67	87.30
T_7	75 % N (V.C) + 25 % N inorganic fertilizer	19.16	22.99	10.40	76.69
T_8	75 % N (P.M) + 25 % N inorganic fertilizer	19.19	23.02	10.13	72.48
T_9	100 % N (V.C)	17.79	21.35	10.00	82.42
T_{10}	100 % N (P.M)	18.63	22.36	10.00	83.25
T_{11}	50 % N (V.C) + 50 % N(P.M)	16.93	20.31	10.80	76.42
C.D. at 5%		1.150	1.380	1.143	1.540

Note: Vermicompost (VC) and Poultry manure (P.M)

4. Conclusion

Considering growth parameters, yield contributing characters, quality parameters viz. moisture per cent, weight of fruit and fruit per vine the application of 50% N through poultry manure + 50 % N through inorganic fertilizer *i.e.* treatment T_6 was found statistically superior over all the treatments.

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