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Effect of integrated nutrient management on growth parameters of taro (*Colocasia esculenta* var. *antiquorum*)

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Abstract

A field experiment was conducted at the horticultural cum research farm, under AICRP on Tuber Crops, Department of Horticulture, IGKVV, Raipur (C.G.) during kharif season of 2007. The whole experiment comprised of 9 treatments of *Colocasia* received nutrient combinations along with control. The cormels (planting material) of *Colocasia* were planted in randomized block design with three replications. The data revealed that the highest average plant height (72.60 cm) was recorded in T₄: FYM (10 t/ha) + Neem cake (10q/ha). As respect to number of tillers per plant showed that the maximum no. of tillers (6.0) was recorded in T₃: Vermicompost (200kg/ha) + 75% of recommended dose of NPK.

Keywords: colocasia, tuber, cormels, nutrient management, growth parameters

Introduction

Taro (*Colocasia esculenta* var. *antiquorum*) is one of the important tuber vegetable of the world and known as "Great leaved Caladium" or "Elephant ear" in English, "Dasheen" in USA, "Cocoyam" in West Africa. In Chhattisgarh it is locally known as "kochai" and popularly cultivated tuber crops in the whole state. Plants are perennial but cultivated as annuals, lactiferous and very variable herb with 30-150 cm in height. Leaves are large or rather large, obliquely erect long petioled, with varying colour and size. Petiole is sheathing at the base, uniformly light or dark green, green with dark streaks or violet, 40-150 cm long. It consists mainly of the leaves with long petiole which arises in a whorl from the apex of the underground corm, Corms are cylindrical with short internodes and few side tubers. In India, taro is chiefly grown for human consumption and is food after peeled, sliced, cooked and taken with condiments and adjuncts. Taro is mainly cultivated for the edible tubers but the leaves and its young stacks (petiols) are also cooked for the edible tubers but the leaves and its young stacks (petiols) are also cooked, used for making pakoras. Taro is mainly used as food, in some countries it is used for making fermented products. The pressure cooked taro corms after being passed through strainer are allowed to ferment giving an acidic product called "poi". Taro flour is used as baby food and also used for making chips. In global scenario, Africa ranks first in area and production of *Colocasia* followed by Asia and Oceania. In Chhattisgarh, *Colocasia* is mainly grown in tribal areas like Bastar, Kanker, Dantewada, Kawardha, Surguja and Raigarh districts as major tuber crop. In Chhattisgarh state total area under *Colocasia* is 4133 ha with production of 48687 metric tonnes.

Material and Methods

Investigation was carried out during kharif season of 2007, at horticultural cum research farm, Department of Horticulture, IGKV, Raipur (C.G.) under AICRP on Tuber Crops, Department of Horticulture, IGKVV, Raipur (C.G.). Raipur is located in Central Eastern part of Chhattisgarh and lies between 21° 16' North latitude and 81° 36' East longitudes with an altitude of 289.56 meters above the mean sea level. The soil of experimental field was sandy loam in texture [International Pipette method (Black and Evans, 1965)]^[1] which is locally known as 'Matasi' with a pH of 7.2 [Alkaline permanganate method (Subbiah and Asija, 1956)]^[2], Olsen's method (Olsen *et al.*, 1954)^[3], Flame photometric method (Jackson, 1967)^[4], Glass electrode pH meter (Piper, 1967)^[5]. The soil was neutral in reaction and medium in fertility levels having low in N, medium in P and high in K. The whole experiment comprised of 9 treatments of *colocasia* received nutrient combinations along with control. The cormels (planting material) of *colocasia* were planted in randomized block design with three replications.

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The planting of experimental material was on done on 27th July, 2007. All the recommended practices were adopted to raise a good crop. Five random competitive plants were tagged from each plot to take observations. The average values of each observation were calculated on the basis of five random tagged plants. Treatments include, T₁: Vermi compost (200kg/ha) + 25% of recommended dose of NPK, T₂: Vermi compost (200kg/ha) + 50% of recommended dose of NPK, T₃: Vermi compost (200kg/ha) + 75% of recommended dose of NPK, T₄: FYM (10 t/ha) + Neem cake (10q/ha), T₅: FYM (10 t/ha) + Mustard cake (10q/ha), T₆: Recommended dose of NPK @ 80:50:100 kg/ha, T₇: PSB (5 kg/Ha) + Azospirillum (5kg/ha), T₈: VAM (5 kg/ha) + Azospirillum (5 kg/ha), T₉: Control. Taro (colocasia) variety India Arvi-1 was released from IGKVV, Raipur, Chhattisgarh during 2003, for table purpose, used as test crop. The data obtained in respect of growth observations were statistically analyzed by Analysis of variance method (Gomez and Gomez, 1984)^[6].

Result and Discussion

1. Plant height: The data revealed that the highest average plant height (72.60 cm) was recorded in T₄: FYM (10 t/ha) + Neem cake (10q/ha) and at par with T₃: Vermi compost (200kg/ha) + 75% of recommended dose of NPK. The

minimum plant height (61.37 cm) was observed in T₇: PSB (5 kg/Ha) + Azospirillum (5kg/ha).

Similarly Rajes kumar and Vijoy Kumar (2005) reported that the highest plant height was (70.40 cm) recorded with 120 kg N/ha. In Colocasia.

The plant height was significantly higher under FYM @ 10 t/ha + neem cake @ 10q/ha and under vermi compost @ 200 kg/ha + 75% RD of NPK and it may be due to sufficient nutrient, availability for obtaining good plant height.

2. Number of tillers per plant: The data observed on number of tillers per plant showed that the maximum no. of tillers (6.0) was recorded in T₃: Vermi compost (200kg/ha) + 75% of recommended dose of NPK, which was at par with T₂: Vermi compost (200kg/ha) + 50% of recommended dose of NPK, T₄: FYM (10 t/ha) + Neem cake (10q/ha) and T₅: FYM (10 t/ha) + Mustard cake (10q/ha).

The more number of tillers were recorded in above four treatments probably due to the presence of good provided nutrients and better fertility through combinations of applied manures and fertilizers. The minimum number of tillers (3.53) was recorded in T₆: Recommended dose of NPK @ 80:50:100 kg/ha and at par with T₉ (Control).

Verma *et al.* (1996)^[8] also reported that increasing level of nitrogen had positive effect on number of tillers.

Table 1: Effect of different nutrient combinations on average plant height of colocasia

Treatment No.	Treatments	Plant height (cm)
T1	Vermi compost (200kg/ha)+25% of recommended dose of NPK.	66.43
T2	Vermi compost (200kg/ha)+50% of recommended dose of NPK.	66.60
T3	Vermi compost (200kg/ha)+75% of recommended dose of NPK.	67.40
T4	FYM (10 t/ha)+Neem cake (10q/ha)	72.60
T5	FYM (10 t/ha)+Mustard cake (10q/ha)	66.88
T6	Recommended dose of NPK @ 80:50:100 kg/ha.	63.88
T7	PSB (5 kg/Ha)+ Azospirillum (5kg/ha)	61.37
T8	VAM (5 kg/ha)+Azospirillum (5 kg/ha)	62.84
T9	Control	61.70
	SEm±	1.89
	CD (5%)	5.69

Table 2: Effect of different nutrient combinations on average number of tillers per plant of colocasia.

Treatment No.	Treatments	Tillers/Plant (No.)
T1	Vermi compost (200kg/ha)+25% of recommended dose of NPK.	4.26
T2	Vermi compost (200kg/ha)+50% of recommended dose of NPK.	5.53
T3	Vermi compost (200kg/ha)+75% of recommended dose of NPK.	6.00
T4	FYM (10 t/ha)+Neem cake (10q/ha)	5.46
T5	FYM (10 t/ha)+Mustard cake (10q/ha)	5.13
T6	Recommended dose of NPK @ 80:50:100 kg/ha.	3.53
T7	PSB (5 kg/Ha)+ Azospirillum (5kg/ha)	3.93
T8	VAM (5 kg/ha)+Azospirillum (5 kg/ha)	3.73
T9	Control	3.80
	SEm±	0.45
	CD (5%)	1.36

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