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Study on effect of organic manures and inorganic fertilizer on growth attributes of Radish (*Raphanus sativus* L.)

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Abstract

The field experiment was conducted during the *Kharif* season 2015-16 at the Vegetable Research Farm, Sam Higginbottom Institute of Agriculture Technology and Sciences (SHIATS), Allahabad (U.P.). The experiment was laid out in Randomized block design (RBD) thrice including ten treatments viz., treatments T₀ (Control), T₁ (100% Recommended dose of nutrients), T₂ (75% Recommended dose of nutrients + 25% FYM), T₃ (50% Recommended dose of nutrients + 50% FYM), T₄ (25% Recommended dose of nutrients + 75% FYM), T₅ (75% Recommended dose of nutrients + 25% Vermicompost), T₆ (50% Recommended dose of nutrients + 50% Vermicompost), T₇ (25% Recommended dose of nutrients + 75% Vermicompost), T₈ (75% Recommended dose of nutrients + 25% Primary manure), T₉ (50% Recommended dose of nutrients + 50% Primary manure) and T₁₀ (25% Recommended dose of nutrients + 75% Primary manure). The significantly highest plant height (64.34 cm) at 45 days was observed in T₉. The maximum number of leaves per plant (8.62) at 45 days was recorded in (T₉). The maximum leaf length (23.47) was observed in the (T₉). And the highest shoot weight (161.35) was found in treatment (T₉).

Keywords: Inorganic fertilizer, organic manure, growth and Radish

Introduction

Radish is an important crop among root vegetable. Radish roots are good source of vitamin 'C' and it contains 15-45 mg of ascorbic acid in 100g of edible part. Some radish root are red in colour which are high in ascorbic acid content. The pungency of radish is due to presence of isothiocyanate and red colour is due to anthocyanin. Radish is cultivated throughout in India West Bengal, Uttar Pradesh, Punjab, Assam, Haryana, Gujrat and Himachal Pradesh are major radish producing states (Pandey and Chawrasya 2003).

Organic fertilizer application resulted in improvement of growth and yield of different vegetable crops, as for instance, pepper, garlic and cucumber. The positive effects of organic fertilizers on growth and productivity of plants could be attributed to the effect of different organic fertilizers groups which increase the levels of extractable N, P, K, Fe, Zn and Mn as stated by El-Karanmany *et al.*, (2000) [4]. This effect may minimize the amounts of chemical fertilizers and improve their application efficiency and subsequently avoiding environmental pollution. Organic manures plays an important role on growth and chemical constituents of many medicinal and aromatic plants. Meena *et al.*, (2007) [5]. Singh and Kushwah (2006) reported that the effect of organic manures (FYM and compost) in combination with inorganic fertilizers was more pronounced in potato compared with that of organic manures alone and FYM was found more effective than compost in producing higher tuber yield in potato.

Material and Methods

Three plants were selected randomly from each plot and were tagged and maintained as observational plants for recording their growth and yield characters.

1. Plant height (cm): Plant height of three randomly selected plants from each plot were measured in cm from the base of the plant up to the highest level reached by the leaves in natural conditions. From this the average plants highest was calculated and expressed in cm.

2. Number of leaves per plant: Numbers of leaves per plant were counted in 25, 35 and 45 days after sowing were recorded.

3. Leaf Length (cm): By means of a metre scale the leaf length was measured at 25, 35 and 45 days after sowing and recorded in cm.

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4. Shoot weight (g): After harvesting the shoot along with the leaves were detached from the root of individual plant and weighted in the balance and the data were recorded in g.

Result and Discussion

1. Plant height: The data from the Table no. 1 reveals that the meant height of plant at 45 days after sowing. The plant height was significantly affected by the various treatment of

organic manures and inorganic fertilizer over control. The maximum plant height (64.34 cm) was observed in the treatment T₉ 50% RDN + 50% PM followed by T₈ 75% RDN + 25% PM, T₁₀ 25% RDN + 75% PM, T₇ 25% RDN + 75% Vermicompost, T₆ 50% RDN + 50% Vermicompost, T₄ 25% RDN + 75% FYM and T₅ 75% RDN + 25% Vermicompost. Minimum plant height (40.17 cm) was observed in Treatment T₀ (control).

Table 1: Effect of organic manures and inorganic fertilizers on plant height of Radish (*Raphanus sativus* L.)

Treatment symbol	Treatment combination	Plant height (cm)
T ₀	Control	40.17
T ₁	100% Recommended dose of nutrient	46.84
T ₂	75% RDN + 25% FYM	44.32
T ₃	50% RDN + 50% FYM	42.46
T ₄	25% RDN + 75% FYM	51.01
T ₅	75% RDN + 25% Vermicompost	56.34
T ₆	50% RDN + 50% Vermicompost	55.85
T ₇	25% RDN + 75% Vermicompost	61.04
T ₈	75% RDN + 25% Primary manure	62.39
T ₉	50% RDN + 50% Primary manure	64.34
T ₁₀	25% RDN + 75% Primary manure	62.28
S.Ed. (±)		1.53
C.D. at 0.5		3.19

* RDN = Recommended dose of nitrogen and P and K are constants in all the treatments

2. Number of leaves per plant: Persual of Table 2. reveals that the mean leaves of plants. The maximum number of leaves per plant (18.69) was observed in the treatment T₉ 50% RDN + 50% PM followed by T₈ 75% RDN + 25% PM, T₁₀ 25% RDN + 75% PM, T₇ 25% RDN

+ 75% Vermicompost, T₆ 50% RDN + 50% Vermicompost, T₄ 25% RDN + 75% FYM and T₅ 75% RDN + 25% Vermicompost. Minimum number of leaves per plant (15.73) was observed in Treatment T₀ (control).

Table 2: Effect of organic manures and inorganic fertilizers on number of leaves per of Radish (*Raphanus sativus* L.)

Treatment symbol	Treatment combination	Number of leaves
T ₀	Control	15.73
T ₁	100% Recommended dose of nutrient	16.15
T ₂	75% RDN + 25% FYM	16.58
T ₃	50% RDN + 50% FYM	16.45
T ₄	25% RDN + 75% FYM	17.09
T ₅	75% RDN + 25% Vermicompost	17.04
T ₆	50% RDN + 50% Vermicompost	16.40
T ₇	25% RDN + 75% Vermicompost	16.47
T ₈	75% RDN + 25% Primary manure	18.07
T ₉	50% RDN + 50% Primary manure	18.69
T ₁₀	25% RDN + 75% Primary manure	17.91
S.Ed. (±)		0.46
C.D. at 0.5		0.97

3. Leaf length: Persual of Table 3. Reveals that the mean length of leaf. The maximum leaf length (23.47) was observed in the treatment T₉ 50% RDN + 50% PM followed by T₈ 75% RDN + 25% PM, T₁₀ 25% RDN +

75% PM, T₇ 25% RDN + 75% Vermicompost, T₆ 50% RDN + 50% Vermicompost, T₄ 25% RDN + 75% FYM and T₅ 75% RDN + 25% Vermicompost. Minimum leaf length (19.33) was observed in Treatment T₀ (control).

Table 3: Effect of organic manures and inorganic fertilizers on number of leaf length (cm) of Radish (*Raphanus sativus* L.)

Treatment symbol	Treatment combination	Leaf length (cm)
T ₀	Control	19.33
T ₁	100% Recommended dose of nutrient	21.88
T ₂	75% RDN + 25% FYM	22.13
T ₃	50% RDN + 50% FYM	22.60
T ₄	25% RDN + 75% FYM	21.66
T ₅	75% RDN + 25% Vermicompost	21.55
T ₆	50% RDN + 50% Vermicompost	23.00
T ₇	25% RDN + 75% Vermicompost	22.70
T ₈	75% RDN + 25% Primary manure	23.23
T ₉	50% RDN + 50% Primary manure	23.47
T ₁₀	25% RDN + 75% Primary manure	21.85
S.Ed. (±)		1.01
C.D. at 0.5		2.12

4. Shoot weight (g): Data in respect of shoot weight of plant as influenced by organic and inorganic fertilizer are presented in Table 4. It is evident from the data that shoot weight of radish was significantly affected by organic and inorganic fertilizer. The highest shoot weight was found in treatment T₉ (161.35g) and other treatments found next in order in this regard as T₁₀ 25% RDN + 75% PM, T₈ (75% RDN + 25% PM, T₇ 25% RDN + 75% Vermicompost, T₅

75% RDN + 25% Vermicompost and T₄ 25% RDN + 75% FYM. Lowest shoot weight was found in treatment T₀ (111.08g) control. In T₁₀ it is obvious that poultry manure contains more at N, P and K content, which would have resulted into higher shoot weight. Similar findings have been reported by Pimpini *et al.*, (1992) ^[6], Yanwang *et al.*, (2002) ^[7], Abbey (2000) ^[1] and Chezhiyan *et al.*, (2003) ^[3].

Table 4: Effect of organic manures and inorganic fertilizers on number of Shoot weight (g) of Radish (*Raphanus sativus* L.)

Treatment symbol	Treatment combination	Shoot weight (g)
T ₀	Control	111.08
T ₁	100% Recommended dose of nutrient	112.25
T ₂	75% RDN + 25% FYM	124.84
T ₃	50% RDN + 50% FYM	148.14
T ₄	25% RDN + 75% FYM	148.73
T ₅	75% RDN + 25% Vermicompost	149.34
T ₆	50% RDN + 50% Vermicompost	146.35
T ₇	25% RDN + 75% Vermicompost	147.45
T ₈	75% RDN + 25% Primary manure	155.43
T ₉	50% RDN + 50% Primary manure	161.35
T ₁₀	25% RDN + 75% Primary manure	155.84
S.Ed. (±)		5.66
C.D. at 0.5		11.8

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