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Full Length Research Article

EFFECT OF DIFFERENT LEVELS OF VERMICOMPOST ON GROWTH AND YIELD OF RADISH CV. LOCAL VARIETY

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ABSTRACT

The present investigation was undertaken with the main objective of effect of different levels of vermocompost on growth and yield of Radish cv. Local variety. The experiment was laid out in randomized completely block design with five treatments and four replications. The experiment consists of five treatments involving application of vermicompost 0.3, 0.6, 0.9, 1.2 kg/ plot and control. The data clearly revealed that the yield obtained with treatment T_4 (1.2 kg vermicompost + RDF + FYM) was significantly higher than all other treatments with respect to growth and yield i.e. highest leaf length (37.59cm), leaf weight (13.20gm), total no of leaves per plant (10.60), root length (23.11 cm), single root weight (89.03 gm), yield / plot (17.81 kg), yield / ha (59.35 t/ha) and marketable yield (44.51 t/ha) while B:C:R ratio was maximum in T_1 (2.99:1).

INTRODUCTION

Radish (*Raphanus sativus* L.) a member of the family cruciferae is a popular root vegetable in both tropical and temperate regions of the world. It can be cultivated under cover for early production but large scale production in field is more common in India. Radish is grown for its young tender tuberous root, which is consumed either cooked or row. It is a good source of vitamin-C and minerals like calcium, potassium and phosphorus. It has refreshing and diuretic properties. It is also used for neurological headache, sleeplessness and chronic diarrohea. The roots are also useful in urinary complaints and piles. The leaves of radish are good source for extraction of protein on a commercial scale and radish seeds are potential source of nondrying fatty oil suitable for soap making illuminating and edible purposes. In the year 2013, area and production of radish in India was 170.30 Thousand hectare and 2410.78 Thousand metric Tonnes, respectively (Anon., 2013). Being a short duration and quick growing crop, the root growth should be rapid and uninterrupted. Hence, for the production of good quality radish, optimum nutrition through organic and inorganic fertilizers are essential for sustainable production.

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It has been widely accepted that organic farming alone could serve as a holistic approach towards achieving sustainable agriculture as it is nature based, environment friendly and ensures the conservation of resources for the future (Sangeetha and Thevanathan, 2010). Vermicompost is a nutrient-rich, microbiologically-active organic amendment that results from the interactions between earth worms and microorganisms during the breakdown of organic matter. It is a stabilized, finely divided peat-like material with a low C:N ratio, high porosity and high water-holding capacity, in which most nutrients are present in forms that are readily taken up by plants (Domínguez, 2004). Vermicompost may influence plant growth directly via the supply of plant growth regulating substances (PGRs) proposed by Tomati *et al.* (1990); Grapelli *et al.* (1987) and Tomati and Galli (1995).

MATERIALS AND METHODS

The field experiment was conducted at Nare village, Palghar District in Maharashtra during December, 2013-14 in a back side of ASPEE, ARDF, experimental plot of Local variety with the spacing of 15 X 10 cm. The experiment was laid out in randomized block design with five treatments and four replications. The experiment consists of five treatments *i.e.* 0.3, 0.6, 0.9, 1.2 and 0 kg vermicompost/plot were imposed. The vermicompost was applied at the time of land preparation.

Table 1. Effect of different levels of vermicompost application on radish cv. Local variety on growth parameters

Treatments	Leaf length, (cm)	Single radish leaf, (gm)	Total no. leaves per plant	Single root length, (cm)	Single radish weight, (gm)	Yield/ plot, (kg)
T_1	33.16	8.61	8.00	19.68	83.67	16.73
T_2	34.48	10.97	8.80	20.32	85.18	17.04
T_3	36.64	12.40	9.20	22.35	86.74	17.35
T_4	37.59	13.20	10.60	23.11	89.03	17.81
T_5	30.32	8.20	7.60	18.40	80.33	16.07
SEm ±	1.04	0.72	0.58	0.82	0.55	0.11
CD @ 5%	3.12	2.15	1.73	2.47	1.78	0.36
CV (%)	6.76	15.02	14.60	8.86	1.11	1.11

Table 2. Effect of different levels of vermicompost application on radish cv. Local variety on yield parameters

Treatments	Yield per ha, (t/ha)	Marketable yield, (t/ha)	Cost of production, (`/ha)	Total Gross Realization, (`/ha)	Net Realization, (`/ha)	B:C:R
T_1	55.77	41.83	29483.48	116520	94003.97	2.99:1
T_2	56.78	42.58	35783.48	147750	92269.74	2.60:1
T_3	57.82	43.37	34383.48	141930	92613.51	2.47:1
T_4	59.35	44.51	32883.48	135360	93143.17	2.31:1
T_5	53.55	40.16	31783.48	127740	88694.47	2.79:1
SEm ±	0.36	0.27				
CD @ 5%	1.19	0.89				
CV (%)	1.11	1.11				

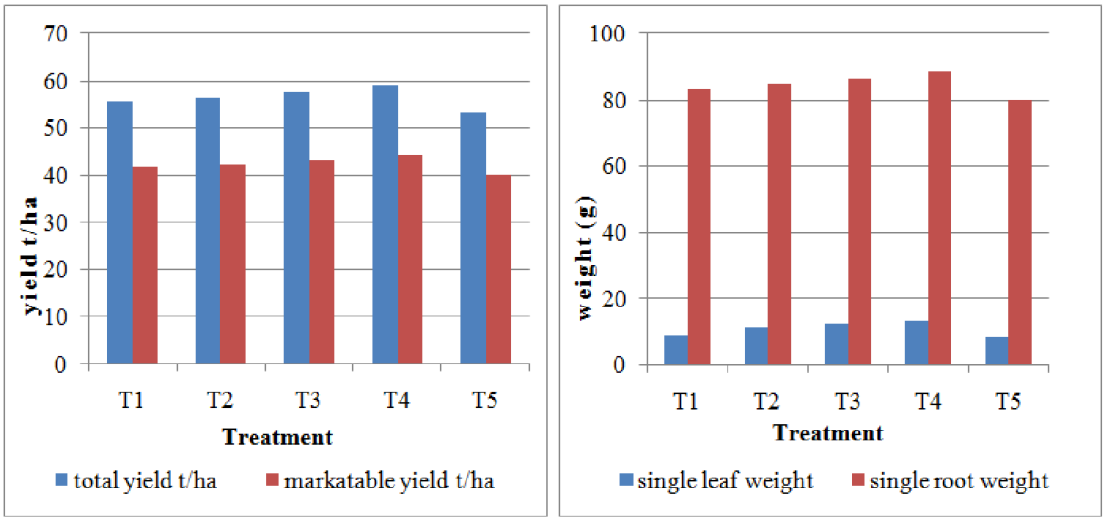

Fig. 1 Effect of different levels of vermicompost on radish Cv. Local variety

An untreated check was also maintained, plot size was 3 x 1 m and each treatment as replicated four times. The recommended doses of 25 tones FYM, half dose 25 kg N, 50 kg P_2O_5 and 50 kg K_2O per hectare at the time of soil preparation and half 25 kg N top dressed in two equal splits at 12 and 23 days after sowing were imposed.

Statistical analysis

The recorded data were statistically analyzed (ANOVA analysis) using the software WASP, (developed at ICAR Research Complex for Goa, India). Sources of variation were fertilizer treatments. Mean comparisons were performed using LSD test to determine whether the difference between the variables were significant at $P < 0.05$.

RESULTS AND DISCUSSION

The present study was undertaken to study the impact of different levels of vermicompost on growth and yield of radish cv. Local. It was significantly recorded by different levels of vermicompost on leaf length, single radish leaf weight and total no of leaves per plant of radish as shown in Table 1. The highest leaf length (37.59cm) was found with T_4 (1.2 kg vermicompost) and the lowest leaf length (30.32 cm) was observed in control treatment T_5. While single radish leaf weight and total no of leaves per plant was also observed maximum in treatment T_4 i.e., 13.20 gm, 10.60 and was lowest in treatment T_5 i.e., 8.20 gm, 7.60, respectively. Significant variation in length and weight was noted with different levels of vermicompost showed in Table 1. Maximum root length (23.11 cm) and weight (89.03 gm) was recorded from treatment T_4 (1.2 kg vermicompost) whereas, minimum root length (18.40 cm) and weight (80.33 gm) was recorded in T_5 control. Root length was maximum in plants involving vermicompost treatments. Root length increase indicates efficient absorption of water followed by transport and conduction. Vermicompost may influence plant growth directly via the supply of plant growth regulating substances (PGRs) proposed by Tomati *et al.* (1990); Grapelli *et al.* (1987) and Tomati and Galli (1995).

Effect of vermiwash spray on radish cv. Local variety yield parameters

The results of the experiment revealed that the radish cv. Local variety yield characters such as yield / plot, yield / ha and marketable yield were significantly influenced by different levels of vermicompost as compared to control with no vermicompost as shown in table 1 and 2 and fig 1. Among the vermicompost treatments, (1.2 kg vermicompost) recorded significantly higher values for yield / plot (17.81 kg), yield / ha (59.35 t/ha) and marketable yield (44.51 t/ha) of radish cv. Local variety. Whereas, lower values yield /plot (16.07 kg), yield/ha (53.55 t/ha) and marketable yield (40.16 t/ha) of radish cv. Local variety was recorded in control (T_5).

Economics

Result regarding in economics i.e. total expenditure, total gross income, net return and benefit: cost ratio are presented in Table 2. Result indicated that, among various treatments, T_2 registered maximum gross return (147750 ` per hectare), and $T_1$ registered maximum net return (94003.97 ` per hectare) and benefit: cost ratio (2.99:1). Minimum gross return (116520 ` per hectare), net return (88694.47 ` per hectare) and B:C ratio (2.31:1) was registered in treatment T_1, T_5 and T_4, respectively. Variation in these profit values was due to yield obtained from various levels of vermicompost which was accountable for maximum return.

Conclusion

From the forgoing discussion, it can be concluded that vermicompost at 1.2 kg is effective than control for growth and yield attributes of radish cv. Local variety. While T_1 is best for cost benefit ratio.

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