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Effect of Organic manure and Jeevamrit on growth yield and quality of radish (*Raphanus sativus* L.) under U.P. condiotion

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Abstract— *Radish is one of the well-known root crop and its popularity could be due to its wider climatic adaptation, easy cultivation method and a wider range of its uses. Excessive chemical fertilizer could lead to chemical toxicity in the root crop and affected the growth and yield of radish. A field experiment was assessed to conducted in randomized block design with five treatment and three replications with the setup of T1 –Without manuring,T2-FYM @5Tha^{-1} +Vermicompost@ 1.75Tha^{-1}+ jeevamrit@5%conc, T3-FYM@5Tha^{-1}+vermicompost@1.75Tha^{-1} +jeevamrit@ 10%conc, T4-FYM @2.5Tha^{-1} +Vermicompost @.087Tha^{-1}+jeevmrit@5% conc and T5-FYM @2.5 Tha^{-1}+Vermicompost@ 0.87Tha^{-1} +jeevamrit @10% conc. respectively to evaluate the effect of organic manure and jeevamrit on growth, yield and quality of radish.The results revealed that treatment T3 -FYM@5Tha^{-1}+vermicompost@1.75Tha^{-1} +jeevamrit@ 10%conc were significantly enhanced the growth characters i.e. number of leaves(28.67)at 120 DAS, leaf length(26.63cm) at 120DAS , Leaf breadth(6.06cm) after 120 DAS whereas, yield characters i.e. root length (26.16cm),root diameter(3.79cm),TSS(5.25^{0}B),Fresh weight of root(20.16g),fresh weight of plant(61.21g), yield(224.64gha^{-1}), were also found highest with T3-FYM@ 5Tha^{-1}+vermicompost@1.75Tha^{-1} +jeevamrit 10% conc. The study suggested that the application of jeevamrit along with organic manures was found more beneficial and significantly improved the growth and yield of radish under U.P. condition.*

Keywords— ***jeevamrit, organic manure, vermicompost, DAS, root weight.***

I. INTRODUCTION

Radish *(Raphanus sativus* L.*)* is an annual quick growing root vegetable crop, grown for their young tender roots and widely cultivated in both tropical and temperate areas of the world. It belongs to the Brassicaceae family and diploid chromosome numbers are 2n=18. Radish is low in calories and a good source of vitamin C, protein, fat, minerals, fibre, and carbohydrates. It supplies variety of minerals like calcium, potassium and phosphorous (Kumar *et al*., 2013). Uses of organic manures and liquid natural fertilizers fertilize the soil and provide nutrients to the plants. By delivering nutrients and increasing the physical, chemical and biological qualities of soil organic manures also adds improvement in soil water holding capacity, aeration and fertility (Mani and Amburani.,2018). Higher cost of synthetic fertilizer contributes to poor health of water and soil (Khalid *et al* 2015). Because of the higher concentration of synthetic fertilizer it becomes imperative to go for alternative and cheeper sources like organic manure and natural liquid fertilizer like jeevamrit (kumar *et al*.,2014). Organic manure increases water holding capacity and improve the nutrient supply of the soil, it reduces the nitrogen loss due to slow release of nutrients and improves the production parameter of radish and dry matter production (Subramani *et al*., 2011). Jeevamrit is a microbial culture that can improve soil fertility and crop productivity. it's a key component of zero budget natural farming. microorganism present in liquid nutrient manure

that help in break down the organic matand ter and release nutrients into the soil (Jaisankar.,2018)

II. MATERIALS AND METHODS

The investigation was assessed to conduct during Rabi season 2023-24 at Hazipur Agriculture Research Farm, Chandra Bhanu Gupta Krishi Mahavidyalaya, B.K.T., Lucknow (U.P.). The field was well leveled having good soil condition. For the entire experiment, 5 treatments were obtained with 3 replications so that there were 15 experimental plot units. Where each experimental plot consists of 40 plants and each experimental unit consists of 5 sample plants that are observed. The data from the observations were then analyzed using analysis of variance (F test) with a level of .05% with the aim of testing significance level of the treatments. Thus, The experiment i.e. effect of different organic manure and jeevamrit on growth yield and quality of radish (*Raphanus sativus* L.) was set up with 5 treatments i.e.T_1Control (without manuring), T_2 (FYM @ 5tha^{-1} +V.C@1.75t/ha+jeevamrit @5%conc. at 2,3&4 days interval), T_3 (FYM @5tha^{-1} +V.C@1.75t/ha+jeevamrit @10%conc. at 2,3&4 days interval), T_4 (FYM @2.5tha^{-1} +V.C@0.87t/ha^{-1}+jeevamrit @5%conc. at 2,3&4 days interval) and T_5 FYM @2.5tha-^{1} +V.C@0.87tha^{-1}+jeevamrit @10%conc. at 2,3&4 days interval)respectively and are replicated three times. The different observations were recorded by various methods are number of leaves, leaf length (cm.), leaf breadth (cm.), root diameter (cm.), root length (cm.), Fresh weight of root (g), Fresh weight of plant (g), yield (q/ha).The experimental field was thoroughly ploughed 1-2 times. Deep ploughing was done to bring the soil to a fine tilth and all the clods of the soil were thoroughly broken stubble and weeds were removed.

Preparation of Jeevamrit -Jeevamrit is a mixture of cow dung, cow urine, jaggery, pulse floor and living soil. For preparation of jeevamrit, required quantities of ingredients were thoroughly mixed in water and allowed to ferment for 7 days. Ingredients were stirred once in morning and once in evening in clockwise direction. Jeevamrit (@ 10 % drenching) was given at fortnight interval in the respective treatments.

Seed treatment 200 g of Jaggery was dissolved in 100 ml of warm water. Seeds were soaked in Jaggery solution for 15-20 minutes and seeds were dried under shade. Sowing was done on 14th October 2023. Seeds were sown on the ridges at spacing of 20-20 cm.

III. RESULT &DISCUSSION

4.1Growth parameters

The effect of different levels of organic manure with combination of fym, vermicompost and liquid organic fertilizer presented in Table 1 showed the significant results at 30,60,90, and 120 days after sowing. The maximum no of leaves(19.05,23.61,26.63,and28.96),leaf length(19.73,21.90,25.36 and 28.67cm),leaf breadth(3.80,4.80,5.60and 6.06cm)were found with treatment T3(FYM @5tha^{-1} +V.C@1.75tha^{-1}+jeevamrit @10%conc.) at all growth stages after 30,60,90 and 120 days after sowing significantly which was followed by treatment T2(FYM @ 5tha^{-1} ±V.C@1.75tha^{-1}+jeevamrit @5%conc.)respectively in comparison to the other treatment .The increase in no of leaves ,length and breadth of leaves with treatment T3 (FYM @5tha^{-1} +V.C@1.75tha^{-1}+jeevamrit @10%conc.) might be due to quick release of N,P,K to the soil and their quick uptake by plants which results in early maturity with good growth of crop. The liquid natural fertilizer that was applied containing the nutrients by which plants need to grow (Bhattarai.,2013). This is in accordance with the result of research by kumar and Painuli 2014) stated that the plants fertilized with animal based liquid fertilizer exhibited higher total biomass with more profuse development of leaves and fibrous roots. Furthermore, it was noted that the liquid natural fertilizer resulted in increased uptake of nutrients. However, the minimum growth characters such as no. of leaves (13.50,16.43,18.20 and 20.96), leaf length (14.85,18.53,21.26 and 23.36 cm) and leaf breadth (3.20,3.66,4.43 and 5.03 cm) were found with control(T1) significantly after 30,60,90 and 120 days of sowing at all stages of growth respectively.

4.2 Yield Parameter

Root diameter and root length was taken after harvest. Statistical analysis revealed significant differences in between the treatments. The application of liquid natural fertilizer jeevamrit in combination of organic manures increase the root diameter, length of root, fresh weight plant and root yield of radish significantly. The data on root diameter, root length, fresh weight of root fresh weight of plant and root yield of radish were furnished in Table 2. Treatment T3(FYM @5tha^{-1} ±V.C@1.75tha^{-1}+jeevamrit @10%conc.) showed the highest root diameter (3.79cm) which was followed by 3.58 cm with T2(FYM @ 5tha^{-1} ±V.C@1.75tha^{-1}+jeevamrit @5%conc).Application of treatment T3 increased the root diameter but higher concentration of jeevamrit in treatment T3(3.79cm)was found at par with T2(3.58cm). An increase in diameter of root of radish may be attributed with the presence of

growth regulators like auxin and gibberellin in it. The lowest root length(21.30 cm)was found with control (T1 Control without manuring)).Application of treatment T3 increased the root diameter but higher concentration of jeevamrit in treatment T3 (3.79cm) was found at par with T2(3.58 cm).Maximum root length(26.16cm),fresh weight of root(20.16g),fresh weight of plant(61.21g) and root yield (224.64qha^{-1})was found with T3(FYM @5tha^{-1} V.C@1.75tha^{-1}+jeevamrit @10%conc) significantly.

Table 1: Effect of different organic manure and jeevamrit on number of leaves, leaf length, and leaf breadth of radish.

Treatments	Number of Leaves				Leaf length(cm)				Leaf breadth(cm)			
	30 DAS	60 DAS	90 DAS	120 DAS	30 DAS	60 DAS	90 DAS	120 DAS	30 DAS	60 DAS	90 DAS	120 DAS
T_1: Control (without manuring)	13.50	16.43	18.20	20.96	14.85	18.53	21.26	23.36	3.20	3.66	4.43	5.03
T_2: FYM @ 5tha^{-1} +V.C@1.75tha^{-1}+jeevamrit @5%conc.	18.30	21.56	24.26	28.20	18.98	23.23	26.46	28.56	3.63	4.20	5.10	5.70
T_3: FYM @5tha^{-1}. +V.C@1.75tha^{-1}+jeevamrit @10%conc	19.73	21.90	25.36	28.67	19.05	23.61	26.63	28.96	3.80	4.80	5.60	6.06
T_4: FYM @2.5tha^{-1} +V.C@0.87tha^{-1}+jeevamrit @5%conc.	17.40	19.33	23.26	26.50	17.48	20.33	23.40	27.23	3.53	4.16	4.80	5.10
T_5: FYM @2.5tha-^{1} +V.C@0.87tha^{-1}+jeevamrit @10%conc.	16.26	17.40	20.23	23.20	16.24	19.20	22.33	25.50	3.50	4.20	5.30	5.40
SE m±	0.186	0.190	0.071	0.144	0.092	0.298	0.245	0.119	.073	.074	.077	.075
CD at .05% level	0.616	0.630	0.236	0.476	0.304	0.987	0.811	0.394	.242	.246	.254	.247

Table 2 Effect of different organic manure and jeevamrit on Root diameter, Root length, Fresh weight of root, Fresh weight per Plant and Root Yield of radish.

Treatments	**Root diameter (cm.)**	**Root length (cm.)**	**Fresh weight of root (g.)**	**Fresh weight of plant (g.)**	**Root Yield (q/ha.)**
T_1: Control (without manuring)	2.72	21.30	16.59	49.79	184.34
T_2: FYM @ 5tha^{-1} +V.C@1.75tha^{-1}+jeevamrit @5%conc.	3.58	25.56	19.54	58.97	217.12
T_3: FYM @5tha^{-1} +V.C@1.75tha^{-1}+jeevamrit @10%conc.	3.79	26.16	20.16	61.21	224.64
T_4: FYM @2.5tha^{-1} +V.C@0.87tha^{-1}+jeevamrit @5%conc.	3.17	25.33	18.81	56.63	209.71
T_5: FYM @2.5tha-^{1} +V.C@0.87tha^{-1}+jeevamrit @10%conc.	3.44	25.03	19.48	58.41	216.45
SE m±	0.013	0.153	0.028	0.372	0.468
CD at .05% level	0.042	0.506	0.093	1.231	1.551

Different levels of organic liquid formulations like jeevamrit and organic manures enhanced the carbohydrate synthesis and effective translocation of photosynthesis to developing sinks. Jeevamrit increased synthesis of growth promoting substance which in turn helped in increasing growth and yield attributes and finally yield of root. Same findings were revealed by patel (2019).Talashikar et al (1999) reported the beneficial effect of jeevamrit which was attributed to high microbial populations and enzyme due to availability and uptake of nutrients and growth hormone ultimately resulted in better growth and yield of crop. The lowest root diameter(2.72cm)root length (21.30cm)fresh weight of root (16.5g),fresh weight of plant (49.79g) and root yield per hectare (184.34Q) were recorded with T1(control) significantly at all stages of growth of crop.

IV. CONCLUSION

On the basis of present investigation, it could be inferred that vegetative growth for higher numbers of leavers, leaf length, leaf breadth and yield characters like root diameter, maximum root length, fresh weight of root, fresh weight of plant, root yield were obtained with the application of FYM @5t/ha, vermicompost @1.75t/ha + jeevamrit @10%conc. with treatment T3 significantly. The liquid organic manure are rich source of different plant growth hormone and beneficial microorganism and was applied in combination with RDF gave highest growth and yield in radish.The study clearly revealed that there was significant improvement in growth and yield with the combined application of liquid natural manure i.e. jeevamrit @10% concentration,Fym@5Tha^{-1} and vermicompost1.75Tha^{-1} and recommended dose of fertilizer as compared to control.

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