



## RESPONSE OF *PENNISETUM GLAUCUM* (L.) R.BR. CULTIVATED ON ORGANIC MANURES AND BIOFERTILIZER

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### ABSTRACT:

*Pennisetum glaucum* (L.) R.BR cultivated on organic fertilizers like Vermicompost and Neem Cake, Biofertilizers Azotobacter and Phosphate solubilizing bacteria and NPK with respect to Control. Vermicompost (VC) and Neemcake (NC) available in local market were used to conduct the experiment at the rate 4444 kg ha<sup>-1</sup>. Biofertilizer Inora Azobacter and Inorabiophos as well as Vrakshamitra were used at the rate 10 kg, 10kg and 26 kg ha<sup>-1</sup> respectively. Seeds were sown in the research plots of size 1.5x1.5 m. at the rate of 10 kg ha<sup>-1</sup>. Total biomass is calculated at 70 DAS. DM kg ha<sup>-1</sup> was recorded highest in VC followed by NPK, BIO, and NC and lowest in CON. DM was statistically significant in VC and NPK. Chemical analyses of plant shown Nitrogen kg ha<sup>-1</sup> and Total Crude protein kg ha<sup>-1</sup>, TRSkg ha<sup>-1</sup>, P, K, were recorded highest in VC.

**Keywords-** Pearl millet, Organic manures, Vermicompost, Neem cake, Biofertilizers, *Pennisetum glaucum*

### INTRODUCTION:

The profitability of organic farms depends on the higher prices that their products command in the market. Application of any organic residues whether from plant or animal origin has direct and indirect effects on the physical, chemical and biological properties of the soil. These materials affect the soil properties (Hulugalle *et al*, 1996), soil faunal populations and the availability of soil nutrients (Wade and Sanchez, 1983).The application of Vermicompost at rate 1 ton per ha and release of earthworms of 50,000 per ha increased pod yield significantly in groundnut (Agasimani *et al*, 1989).Vermicompost shows high water holding capacity and proper supply of macro and micro-nutrients and it has a positive effect on biomass production and subsequently the enhanced plant height (Atiyeh *et al* 2002). Influence of vermicomposts on strawberries and study the effect on the growth, yields and showed positive effect on biomass production

also shows improvement through the biological activities of soil and mineral element absorption (Arancon *et al* 2004). Arguello *et al* (2006) have shown that the application of vermicompost on *Allium Sativum* caused greater yield. Vermicompost could increase the growth and yield of geranium (Chand *et al*. 2007). Increasing soil quality due to VC application is reflected in plant growth and production (Shriti Piya *et al* 2018) .

### METHODOLOGY:

The field experiment was conducted in the field at Shevgaon District Ahmednagar during 2006. The experiment was conducted in a randomized block design (RBD) with five treatments and three replicates. Organic Manures as Vermicompost and Neemcake were used at rate 4444 kg ha<sup>-1</sup>. Biofertilizers Inora Azobacter and Inora biophos, and Vrakshamitra were used at rate 10 kg, 10kg and 26 kg ha<sup>-1</sup> respectively.All the manures and biofertilizers were applied to

appropriate plots except chemical fertilizer (NPK) plots. Pearl millet (*Pennisetum glaucum* (L.) R.Br.) Variety “Rijka Bajara” was sown in the research plots of size 1.5x1.5 m. at the rate of 10 kg ha<sup>-1</sup>. The inorganic fertilizers were supplied as Nitrogen (N), Phosphorus (P) and Potassium (K) through urea, single super phosphate (SSP) and muriate of potash at the rate of 90 N, 40 P and K 30 kg ha<sup>-1</sup> only for fertilizer treatment plots in two split doses, half dose as basal dose and half dose at 30 DAS. Use of insecticides and pesticides was completely avoided. Plant Samples were collected randomly at 70 DAS. 100 gram aerial biomass kept to oven dry at 90°C for 48 hours. DM was recorded and dried samples were pulverized. Powdered Samples were analyzed for nutrient uptake by using standard analytical methods. All the results were statistically analyzed using standard statistical method which allowed determination of significance between different applications (Mungikar, 1997, 2003).

## RESULTS AND DISCUSSION:

### Analyses of Total biomass (Table-1)

Fresh weight per plot and kg ha<sup>-1</sup> was recorded highest in NPK (10.33, 45925.88) followed by VC (9.83, 43703.66), BIO (8.25, 36666.63) NC (7.33, 32592.56) lowest in CON (6.00, 26666.64). FW was statistically significant in all treatments except NC. % DM recorded highest in CON (27.40) followed by VC (25.76), BIO (24.72), NPK (23.61) and lowest in NC (23.04). DM kg ha<sup>-1</sup> was recorded highest in VC (11258.06) followed by NPK (10844.63), BIO (9062.77), NC (7510.41) and lowest in CON (7306.66). DM was statistically significant in VC and NPK. %N recorded highest in VC (1.22) followed by NC (1.19), NPK (1.17), BIO (1.08) and lowest in CON (0.86), statistically significant in all treatments. Nitrogen kg ha<sup>-1</sup> and Total Crude protein kg ha<sup>-1</sup> was recorded

highest in VC (137.54, 859.65) followed by NPK (126.47, 790.44), BIO (98.14, 613.38), NC (89.67, 560.45) and lowest in CON (62.89, 393.08). Results were statistically significant in all treatments except NC. %TRS was highest in VC (2.45) followed by NC (2.44), BIO (2.13), NPK (2.00) and lowest CON (1.93). %TRS was statistically significant only in VC and NC treatments. The content of TRS kg ha<sup>-1</sup> was recorded highest in VC (275.47) followed by NPK (216.89), BIO (192.87), NC (182.95) and lowest in CON (140.78), TRS kg ha<sup>-1</sup> is significant in VC and NPK and Bio. %Phosphorus (P) was highest in VC (0.29) followed by NPK (0.23), Bio (0.21) and NC (0.14) lowest in CON (0.10), values were statistically significant in all treatments except NC. %Potassium (K) was highest in VC and NC (0.19) followed by BIO and NPK (0.17) and lowest in CON (0.10), values were statistically significant in all treatments. The content of %Calcium (Ca) was highest in BIO (0.40) followed by VC (0.34), BIO and NC (0.32) treatments and lowest in CON (0.28). These results were statistically significant only in VC and BIO treatments.

Thiyageshwari and Perumal (2000) reported that Vermicompost application significantly enhanced grain yield. Kumari and Usha kumari (2002) reported that enriched Vermicompost+ 15 or 30 kg P<sub>2</sub>O<sub>5</sub> was superior in terms of yield and uptake of major nutrients, such as N, P, K, Ca, and Mg. Vermicompost application increases more biomass production of various plants such as *Artemisia pallens*, *Hardeum vulgare* (Pandey 2005). Roy & Singh (2006) reported a large number of productive tillers of barley in response to vermicompost application. The highest plant height, umbel number per plant, biological and seed yield were obtained after applying 10 ton/ha

vermicompost along with phosphate solubilizing bacterium (Darzi *et al* 2012).

#### CONCLUSION:

*Pearl Millet crop* gives better results for DM and nutrient content by applying the Vermicompost. Vermicompost proved better than NPK in production of DM, N, Total Crude protein, Total Reducing Sugar, P, K, Ca content. It is concluded that the use of eco-friendly low cost organic manures as Vermicompost and Biofertilizer for the production of best quality crop with higher yield which will reduce the production cost and increase the financial status of the farmers within a short time and protecting the environment.

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**Table :1 Analyses of Total biomass of Pearl millet (at 70 DAS)**

Treatment	Fresh weight		DM		N		Total CP	Total RS		%		
	kg plot <sup>-1</sup>	Kg ha <sup>-1</sup>	%	Kg ha <sup>-1</sup>	%	Kg ha <sup>-1</sup>	Kg ha <sup>-1</sup>	%	Kg ha <sup>-1</sup>	P	K	Ca
VC	09.83	43703.66	25.76	11258.06	1.22	137.54	859.65	2.45	275.47	0.29	0.19	0.34
BIO	08.25	36666.63	24.72	09062.77	1.08	098.14	613.38	2.13	192.87	0.21	0.17	0.40
NC	07.33	32592.56	23.04	07510.41	1.19	089.67	560.45	2.44	182.95	0.14	0.19	0.32
NPK	10.33	45925.88	23.61	10844.63	1.17	126.47	790.44	2.00	216.89	0.23	0.17	0.32
CON	06.00	26666.64	27.40	07306.66	0.86	062.89	393.08	1.93	140.78	0.10	0.10	0.28
SE	0.80	3542.00	0.78	818.00	0.07	13.30	83.80	0.109	22.20	0.03	0.02	0.02
CD	1.84	8182.02	1.80	1889.58	0.15	30.72	193.58	0.250	51.28	0.08	0.04	0.05