

EFFECT OF NPK WITH DIFFERENT ORGANIC MANURES ON BIOMETRIC PARAMETERS OF BHENDI (*ABELMOSCHUS ESCULENTUS* L. VAR. *ARCA ANAMICA*)

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An experiment was conducted to investigate the effect of NPK with different organic manures (FYM, composted coir pith, vermicompost and neem cake) on the biometric parameters of bhendi (*Abelmoschus esculentus* L. var. *Arca anamica*). The NPK + FYM showed increased root length and shoot length on 30 DAS (days after sowing) whereas on 60 DAS the root length was increased by NPK + vermicompost and shoot length by NPK + composted coir pith treatment. The fresh weight of the plant was higher in NPK + neem cake on 30 DAS and in NPK + FYM on 60 DAS. The dry weight was more due to NPK application on 30 DAS and NPK + FYM application on 60 DAS. The biometric parameters were observed to be least in control.

Keywords : NPK, organic manures, biometric characters.

Introduction

Integrated use of fertilizers, organic manures and biological sources help in maintaining yield stability on certain soils through correction of marginal deficiencies of secondary and micronutrients, enhancing efficiency of applied nutrients and providing favourable soil physical conditions¹.

Organic manures must form an indispensable component of the manurial schedule for any crop². Concentrated organic manures that are rich in plant nutrients could replace that inorganic fertilizers on equivalent nutrient basis. Application of organic manure improves the physical, chemical and biological properties with direct impact moisture retention, root-growth and nutrient conservation, etc³.

Realising the necessity of use of organic manures, an investigation was carried out using NPK alone and admixed with organic manures (Farm yard manure, composted coir pith, vermicompost and neem cake) to find out their effect on biometric parameters of bhendi (*Abelmoschus esculentus* L. var. *Arca anamica*).

Materials and Methods

The study was conducted at Avinashilingam Deemed University Campus, Coimbatore. The red loamy soil from P & T Colony, near Saibaba Colony, Coimbatore was used for

the study. The pots having 7 kg capacity were filled with the soil. The dosage of manures used (3.5g/kg) was as per the recommendation of Tamil Nadu Agricultural University, Coimbatore. Bhendi seeds were procured from Krishi Vigyan Kendra, Tamil Nadu Agricultural University, Coimbatore. Twenty seeds were sown in each pot containing the red loamy soil admixed with the following ameliorants.

T₁ - Control - Red loamy soil (7 kg);
T₂ - NPK (24.5 g)/pot; T₃ - NPK (12.25 g) + Farm yard manure (12.25 g)/pot; T₄ - NPK (12.25 g) + Composted coir pith (12.25 g)/pot; T₅ - NPK (12.25 g) + Vermicompost (12.25 g)/pot; T₆ - NPK (12.25 g) + Neem cake (12.25 g)/pot.

Each treatment consisting of three replications in completely randomised design was used for the experiment. The pots were regularly watered with frequent weeding. On 30th day after sowing thinning was done leaving ten plants in each pot. The biometric parameters were analysed on 30 and 60 days after sowing.

Biometric parameters analysed 30 and 60 days after sowing were :

1. Root length; 2. Shoot length; 3. Fresh weight of plant; 4. Dry weight of plant.

One plant was selected from each treatment per replication and washed to get

rid of adhering soil particles. Then the length of root was measured with a scale from root collar point to root tip and expressed in cm. The shoot length of the same plant is recorded from the root collar point to shoot apex and recorded in cm. The plant is then used for taking the fresh weight. The fresh weight is expressed in g. Then the plant is wrapped in butter paper and placed in a hot air oven at 70°C for 12 hours. The weight of the dried plant is taken and recorded in g.

Statistical Analysis

The data obtained from the various biometric analysis were subjected to statistical analysis⁴. Based on the results inferences were drawn. Wherever the treatment differences were significant, critical differences were worked out.

Results and Discussion

Biometric Parameters : The results of the biometric parameters analysed on 30 and 60 days after sowing of bhendi are discussed here. The values of biometric parameters are given in Table 1.

Root Length : The root length differed significantly among the treatments.

The longest root length of the plant was recorded in T₃ (NPK + FYM) on 30 DAS (10.30 cm) and in T₅ (NPK + VC) on 60 DAS (26.4 cm). The lowest root length was recorded in control on 30 and 60 DAS (4.90 cm and 14.23 cm).

The result was in accordance with Ramasamy *et al.*⁵, who observed that farm yard manure enriched with phosphorus when applied to soybean plants resulted in increased root length.

According to Thanunathan *et al.*⁶, vermicomposted coir pith increased the root length of onion. This might be due to favourable physical conditions of soil and availability of plant nutrient in sufficient quantities.

Shoot Length : The shoot length of the plants showed significant variations in different treatment. Among the treatments T₃ (NPK

+ FYM) showed increased shoot length (34.73 cm) on 30 DAS and in T₁ (NPK + CCP) on 60 DAS (46.93 cm). The shortest shoot length was observed in control on 30 (22.50 cm) and 60 (21.27 cm) DAS.

Khandkar and Nigam⁷ have documented that application of NPK + farm yard manure increased the plant height of ginger. The increase was probably due to beneficial effect on soil properties, moisture retention, better nutrient availability and above all more favourable conditions for good rhizome growth.

According to Jayakumar and Shaji⁸ the combined application of coir pith compost and biogas slurry resulted in maximum increase in shoot growth of corn.

Fresh Weight : The fresh weight varied significantly in different treatments.

Higher fresh weight was observed in T₆ (NPK + neem cake) on 30 DAS (5.57 g) and in T₃ (NPK + farm yard manure) on 60 DAS (9.53 g). Lower fresh weight was observed in control on 30 and 60 DAS (2.44 g and 2.98 g respectively).

The results of earlier studies demonstrating an increase in fresh weight due to combined application of FYM + muriate of potash support the observation of present investigation⁹.

Rosner and Zebitz¹⁰ observed more fresh weight of tomato plant with the application of neem leaves and neem seed kernels.

Dry Weight : The dry weight varied significantly among the treatments.

The treatment containing NPK alone (T₂) showed higher dry weight at 30 DAS (1.33 g) and in T₃ (NPK + Farm yard manure) on 60 DAS (1.81 g). It was found to be least in control (0.37 g and 1.06 g) respectively.

Results of Sudesh Kumar¹¹ revealed that dry matter of Sorghum was significantly more with FYM and nitrogen. This can be attributed to the fact that bulk density,

Table 1. Effect of NPK with different organic manures on biometric parameters of bhendi (*Abelmoschus esculentus* L. Arca anamica).

Treatments	Root length (cm)		Shoot length (cm)		Fresh weight (g)		Dry weight (g)	
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS
	T ₁ -Red loamy soil	4.90	14.23	22.50	21.27	2.44	2.98	0.37
T ₂ -NPK	8.77	24.50	31.20	35.27	3.65	7.57	1.33	1.27
T ₃ -NPK + Farm Yard Manure	10.30	21.93	34.73	44.83	4.00	9.53	0.75	1.81
T ₄ -NPK + Composted coir pith	5.97	23.77	32.00	46.93	4.08	7.18	0.93	1.56
T ₅ -NPK + Vermicompost	9.23	26.47	26.60	35.83	3.43	7.63	0.50	1.37
T ₆ -NPK + Neem cake	8.60	22.67	32.33	38.67	5.57	7.89	0.97	1.52
SEd	0.64	1.71	1.34	1.29	0.27	0.59	0.18	0.16
CD (1%)	1.96	5.24	4.10	3.94	0.83	1.80	0.54	0.48

porosity, water holding capacity and infiltration rate of soil significantly improved with the application of organic manures¹².

Available nutrient content in soil which influences the nutrient content of tissue and total soil. Thus application of NPK to soil improved the respective nutrient content resulting in a marked increase in biomass production of wheat and swede rape¹³.

Maiti *et al.*¹⁴ also reported increase in growth parameters of ginger due to organic manure and inorganic fertilizer. The increase was probably due to beneficial effect on soil properties, moisture retention, better nutrient availability and above all more favourable conditions for good rhizome growth.

References

1. Singh G B and Dwivedi B S 1996, *Indian Farming* **46** (8) 9
2. Kumarasamy K 2001, *Kisan World* **28**(1) 23
3. Krishnakumar S and Jawahar D 2001, *Kisan World* **28** (3) 41
4. Panse V G and Sukhatme P V 1978, *Statistical methods for Agricultural Workers*, ICAR, New Delhi, p 327
5. Ramasamy N, Sankaran N and Ganapathy N 2000, *The Hindu Science and Technology* P BS-8.
6. Thanunathan T, Natarajan S, Senthilkumar R and Arulmurugan K 1997, *Madras Agricultural Journal* **84**(7) 382
7. Khandkar U R and Nigam K B 1996, *Indian J. Agri. Sci.* **66** (9) 549
8. Jayakumar M and Shaji C 1993, *Current Agriculture* **17** (1-2) 63
9. Geetha K, Raju A S and Shanthi M 1999, *Journal of Research ANGRAU* **27** (1 and 2) 18
10. Rossner J and Zebitz C P W 1986, In : *Natural pesticides form from the neem tree (Azadirachta indica A. Juss) and other tropical plants*, Proc. 3rd Int. Neem Conf. Nairobi, Kenya, 10-15, July 1986.
11. Sudesh Kumar 1998, *Haryana Journal of Agronomy* **14**(1) 91
12. Malewar G U, Badole S B, Mali C V, Siddiqui M B and Ismail S 2000, *Annals of Agricultural Research* **21** (2) 187
13. Mahajan G, Negi S C and Sardana V 1999, *Annals of Agricultural Research* **20** (3) 377
14. Maiti P K, Sengupta D, Som M G, Jana P K and Bose T K 1985, In : *Proceedings of Vth Indian Society of Horticultural Sciences Symposium on Medicinal, Aromatic and Spice Plants*, pp. 117-122.