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## Integrated nutrient management (INM) practices influenced vegetative growth and flowering of rainy season bottle gourd [*Lagenaria siceraria* (Molina) Standl.] c.v. pusa hybrid-3

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### Abstract

A field experiment was conducted at Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, (U.P) India, during the rainy season of 2017, to study the influence of Integrated Nutrient Management (INM) on vegetative growth and flowering of Rainy Season Bottle Gourd. The experiment was laid out in randomized block design with three replications consisted of nine treatment combinations viz. T<sub>0</sub> (Control), T<sub>1</sub> [FYM @20t/ha], T<sub>2</sub> [FYM @ 10t/ha +half N.P.K through chemical fertilizer], T<sub>3</sub> [Neem cake @ 1t/ha], T<sub>4</sub> [Neem cake @0.5t/ha + half N.P.K through chemical fertilizer], T<sub>5</sub> [Vermi compost @ 5t/ha], T<sub>6</sub> [Vermi compost @2.5t/ha + half N.P.K through chemical fertilizer], T<sub>7</sub> [Poultry Manure @ 5t/ha] and T<sub>8</sub> [Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer] were allocated randomly in each plot. The plants were planted at 1m X 1.5m spacing in each 6m<sup>2</sup> plot size. The data were collected from five randomly selected plant of each treatment and subjected to statistical analysis. The results revealed that the treatment T<sub>8</sub> (Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer) significantly found best among the all treatments at all successive growth stages in term of maximum vine height (8.93m), Number of branches (6.65), length of lateral branches (4.04m) and leaf area/plant (506.72cm<sup>2</sup>) as growth parameters whereas minimum days to 1st male flower (63.30days), days to 1st female flower (66.81days), node no. to 1st female flower (11.94) and more no. of male flower (76.54), maximum no. of female flower (30.06) and lowest per cent deformed fruits (10.45%) were found significant as flowering parameters while lowest response for these parameters were recorded with T<sub>0</sub> (control) which received only recommended dose of NPK.

**Keywords:** Bottle gourd, growth, flowering, vermicompost, poultry manure, neem cake and NPK

### 1. Introduction

Bottle gourd (*Lagenaria siceraria* (Molina) Standl; 2n=22) is an important cucurbitaceous crop grown throughout the country. It is native in South Africa. Bottle gourd or white flowered gourd is commonly known as Lauki or Ghiya in India. It is one of the most important cucurbits cultivated in India. It is grown in summer season as well as in rainy season (Yadav *et al.*, 2010) [17]. Fruit in green and tender stages are used as vegetables, sweets, *raita* and pickles. The young fruits are usually used as vegetable dishes. The hard shells of mature fruits are used as containers, hats, decorative handy-crafts and flatus musical instruments.

Numerous health benefits are reported in bottle gourd including its anti-cancerous, cardio protective (Fard *et al.*, 2008) [8], diuretic, aphrodisiac, general tonic, antidote to certain poisons and scorpion stings, alternative purgative and cooling effects (Badmanaban and Patel, 2010) [1]. It can also be used to cure pain, ulcers and fever and is used for pectoral cough, asthma and other bronchial disorders using prepared syrup from the tender fruits (Upaganlawar and Balaraman, 2010) [16]. Bottle gourds are known to lower cholesterol, triglyceride, low density lipoproteins, pain and inflammation (Ghule *et al.*, 2006) [9], free radicals and oxidation (Deshpande *et al.*, 2008 and Kubde *et al.*, 2010) [7, 10].

During the last two decades there has been a constant progress in the production of bottle gourd by farmers, particularly with the traditional method of cultivation. Integrated plant nutrient management (IPNM) is the best approach for obtaining potential crop yield with less expenditure. On the other hand, current intensive agriculture is harmful for the soil, environment and human health. A judicious use of organic manures along with chemical fertilizers may be effective not only in sustaining crop productivity and soil health, but also in

supplementing chemical fertilizers requirement of the crops (Pandey *et al.*, 2009 and Chaurasia and Rai 2009) <sup>[13, 6]</sup>.

Among the organic sources, the old age concept of nutrient application is the utilization of farm yard manure, vermicompost is easily prepared and much effective manure and Fresh poultry manure represents about 5% of live bird weight whereas neem is a bio degradable and eco-friendly natural product, nourishes the soil and plants by providing all the macro and micro-nutrients, helps to eliminate bacteria responsible for denitrifying the soil, ideal for cash crops and food crops, increases the yield of crops, helps to reduce the usage of fertilizer,. These manures being good source of essential plant nutrients especially NPK and give good crop stand by virtue of improvement in physical, chemical and biological characteristics of the soil.

## Materials and Methods

An investigation was carried out to study the influence of Integrated Nutrient Management (INM) on vegetative growth and flowering of Rainy Season Bottle Gourd at Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, (U.P) India, during the rainy season of 2017. The experiment was laid out in randomized block design with three replications consisted of nine treatment combinations viz. T<sub>0</sub> (Control), T<sub>1</sub> [FYM @20t/ha], T<sub>2</sub> [FYM @ 10t/ha +half N.P.K through chemical fertilizer], T<sub>3</sub> [Neem cake @ 1t/ha], T<sub>4</sub> [Neem cake @0.5t/ha + half N.P.K through chemical fertilizer], T<sub>5</sub> [Vermi compost @ 5t/ha], T<sub>6</sub> [Vermi compost @2.5t/ha + half N.P.K through chemical fertilizer], T<sub>7</sub> [Poultry Manure @ 5t/ha] and T<sub>8</sub> [Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer] were allocated randomly in each plot. The plants were planted at 1m X 1.5m spacing in each 6m<sup>2</sup> plot size. The data were collected on growth and flowering parameters from five randomly selected plants of each treatment.

According to basal dose of 120 kg N, 60 kg P<sub>2</sub>O<sub>5</sub> and 60 kg K<sub>2</sub>O/ha along with FYM (20t/h), Neem cake (1t/h), Vermicompost (7t/h) and Poultry manure (5t/h) were applied as per the treatment combinations. One third nitrogen and entire quantity of P and K was applied prior to sowing. Remaining dose of nitrogen was applied in two splits of doses one at 30 and one at 60 days after sowing. FYM, Neem cake, Vermicompost and Poultry manure were applied in the soil at the time of field preparation. The manures and fertilizers as per treatments were thoroughly mixed in the soil with the help of weeding hoe.

## Results and Discussion

### Growth parameters

Integrated nutrient management (INM) is a very effective and efficient method to supply nutrients to the plants. The findings of the present investigation revealed that the combination of different organic manures and inorganic fertilizers significantly affected growth parameter like vine length, number of branches, length of lateral branches and leaf

area/plant (cm<sup>2</sup>) during the growth period of bottle gourd as shown in (Table 1).

Among the treatments, the highest vine length (8.93m) was recorded with treatment T<sub>8</sub> (Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer) with more number of branches per plant (6.65). Similarly the significant increase in length of lateral branches (4.04m) and leaf area/plant (506.72cm<sup>2</sup>) was attained maximum with the use of Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer in treatment T<sub>8</sub> and followed by treatment T<sub>6</sub> (Vermi compost @ 3.5t/ha + half N.P.K through chemical fertilizer) with the same growth parameters. However the lowest mean values in term of vegetative growth traits was observed in T<sub>0</sub> (control). The organic manure applied in the form of FYM, Poultry Manure, Neem Cake and Vermicompost might have improved the soil physical and chemical properties and leading to the adequate supply of nutrients to the plants which might have promoted the maximum vegetative growth while the minimum plant growth was due to limited availability of nutrients. The results reported with Bindiya *et al.* (2006); Sareedha *et al.* (2006) in gherkin and Opara *et al.* (2013) <sup>[12]</sup> in cucumber are in close conformity with these findings. Similar results have also been reported by Baghel *et al.* (2017) <sup>[2, 3]</sup> in bottle gourd and Singh *et al.* (2017) <sup>[15]</sup> in cucumber.

### Flowering Parameters

The time taken to the first flower appearance is an important pre-requisite which decides the earliness and high yield. The results of the experiment revealed that the combination of different organic manures and inorganic fertilizers significantly influenced the flowering parameters like node no. to first female flower, days to 1<sup>st</sup> male flower appearance, days to 1<sup>st</sup> female flower appearance, no. of male flowers, no. of female flowers and per cent deformed fruits during the flowering period of bottle gourd. The data relevant to flowering traits is presented in (table 2).

At the minimum node no. to first female flower (11.94), bottle gourd plant taken minimum days to 1<sup>st</sup> male flower appearance (63.30) with the corresponding minimum days to 1<sup>st</sup> female flower appearance (66.81) in treatment T<sub>8</sub> (Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer) which resulted in maximum no. of male flowers (76.54) and more no. of female flowers (30.06) with the lowest percent deformed fruits (10.45%) with the use of Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer in treatment T<sub>8</sub> followed by T<sub>6</sub> (Vermi compost @ 3.5t/ha + half N.P.K through chemical fertilizer), while the delayed flowering and less no. of male and female flowers were noted with T<sub>0</sub> (control). The earliness to flowering with more no. of flowers in treatment T<sub>8</sub> might be due to the better translocation of nutrients to the aerial parts. Similar findings were reported by Bairwa and Fageria (2008) <sup>[4]</sup>; Baghel *et al.* (2017) <sup>[2, 3]</sup> in bottle gourd and Nagar *et al.* (2017) <sup>[11]</sup>.

**Table 1:** Impact of Integrated Nutrient Management (INM) practices on vegetative growth of Rainy Season Bottle Gourd

Treatments No.	Treatments Combination	Vine Length (m)	No. of Branches	Length of lateral branches (m)	Leaf area/plant (cm <sup>2</sup> )
T <sub>0</sub>	Full recommended dose of N.P.K (120:60:60)	6.07	3.76	3.18	475.75
T <sub>1</sub>	FYM @20t/ha	7.82	5.52	3.72	499.40
T <sub>2</sub>	FYM @ 10t/ha + half N.P.K through chemical fertilizer	6.30	4.03	3.30	479.18

T <sub>3</sub>	Neem cake @ 1t/ha	7.10	5.34	3.64	495.50
T <sub>4</sub>	Neem cake @0.5t/ha + half N.P.K through chemical fertilizer	6.84	4.49	3.51	489.59
T <sub>5</sub>	Vermi compost @ 7t/ha	7.29	4.58	3.47	493.67
T <sub>6</sub>	Vermi compost @3.5t/ha + half N.P.K through chemical fertilizer	8.54	6.20	3.93	501.64
T <sub>7</sub>	Poultry Manure @ 5t/ha	8.10	5.91	3.80	500.33
T <sub>8</sub>	Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer	8.93	6.65	4.04	506.72
	F-test	S	S	S	S
	C.D. at 0.5%	1.10	0.78	0.47	9.44
	S.Ed	0.52	0.37	0.22	4.45

**Table 2:** Impact of Integrated Nutrient Management (INM) practices on flowering of Rainy Season Bottle Gourd

Treatments No.	Treatments Combination	Node no. to 1st female flower	Days to 1st male flower	Days to 1st female flower	No. of male flower	No. of female flower	Per cent deformed fruits
T <sub>0</sub>	Full recommended dose of N.P.K (120:60:60)	15.33	75.48	80.06	65.06	16.66	16.44
T <sub>1</sub>	FYM @20t/ha	12.80	72.48	74.98	73.07	26.00	12.41
T <sub>2</sub>	FYM @ 10t/ha + half N.P.K through chemical fertilizer	14.78	74.13	78.93	66.99	20.09	16.31
T <sub>3</sub>	Neem cake @ 1t/ha	13.27	72.81	75.61	70.89	25.02	13.15
T <sub>4</sub>	Neem cake @0.5t/ha + half N.P.K through chemical fertilizer	14.07	73.62	76.80	69.74	22.15	14.25
T <sub>5</sub>	Vermi compost @ 7t/ha	13.51	73.11	76.31	71.26	22.58	13.82
T <sub>6</sub>	Vermi compost @3.5t/ha + half N.P.K through chemical fertilizer	12.12	65.45	69.15	74.84	28.34	10.93
T <sub>7</sub>	Poultry Manure @ 5t/ha	12.33	68.87	70.00	73.83	28.00	12.48
T <sub>8</sub>	Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer	11.94	63.30	66.81	76.54	30.06	10.45
	F-test	S	S	S	S	S	S
	C.D. at 0.5%	1.40	4.01	4.10	3.94	3.63	1.85
	S.Ed	0.66	1.89	1.93	1.86	1.71	0.87

### Conclusion

On the basis of above findings it is concluded that the treatment T<sub>8</sub> (Poultry Manure @ 2.5t/ha + half N.P.K through chemical fertilizer) was recorded the best among all the treatment combinations through Integrated nutrient management (INM) in terms of vegetative growth and flowering attributes. These results are in support of earliness and higher yield of bottle gourd through INM practices.

### Reference

- Badmanaban R, Patel CN. Journal of Global Pharma Technology. 2010; 4:66-70.
- Baghel, Satish Singh, Bose US, Singh Rajesh, Singh SS. Assessment of various sources of nutrients on growth, yield and yield components of bottle gourd [*Lagenaria siceraria* L.]. *Agric. Update*, 2017; 12(TECHSEAR-7):1940-1945.
- Baghel SS, Bose US, Singh SS. Impact of Different Organic and Inorganic Fertilizers on Sustainable Production of Bottle Gourd [*Lagenaria siceraria* L.], *Int. J Pure App. Biosci.* 2017; 5(2):1089-1094.
- Bairwa LN, Fageria MS. Effects of zinc and integrated use of nitrogen on seed production of bottle gourd var. Pusa Naveen. *Indian J Hort.* 2008; 65(4):506-508.
- Bindiya YD, Srihari D, Dilip Babu J. Effect of organic manures and bio-fertilizers on growth, yield and nutrient uptake in gherkin (*Cucumis anguria* L.) Jars. *ANGRAU.* 2012; 40(1):26-29.
- Chaurasia SNS, Mathura R. Effect of integrated nutrient management and spacing on yield, quality and economics of broccoli *Brassica oleracea* Var. *Italica Plenck.* *Veg. Sci.* 2009; 36(1):61-54.
- Deshpande JR, Choudhari AA, Mishra MR, Meghre VS, Wadodkar SG, Dorle AK. Beneficial effects of *Lagenaria siceraria* (Mol.) Standley fruit epicarp in animal models. *Indian J Exp Biol.* 2008; 46:234-242.
- Fard MH, Bodhankar SL, Dikshit M. Cardioprotective activity of fruit of *Legenaria siceraria* (Molina) Standley on Doxorubicin induced cardiotoxicity in rats. *International Journal of Pharmacology.* 2008; 6:466-471.
- Ghule BV, Ghante MH, Saoji AN, Yeole PG. Hypolipidemic and antihyperlipidemic effects of *Lagenaria siceraria* Stand. fruit extracts. *Indian J Exp. Biol.* 2006; 44:905-909.
- Kubde MS, Khadabadi SS, Farooqui IA, Deore SL. *Lagenaria siceraria*: phytochemistry, pharmacognosy and pharmacological studies. *Rep Opin.* 2010; 2:91-98.
- Nagar M, Soni AK, Sarolia DK. Effect of Organic Manures and Different Levels of NPK on Growth and Yield of Bottle Gourd [*Lagenaria siceraria* (Mol.) Standl.]. *Int. J Curr. Microbiol. App. Sci.* 2017; 6(5):1776-1780.
- Opara, Eunice C, Zuofa K, Isirimah NO, Douglas DC. Effects of poultry manure supplemented by NPK 15:15:15 fertilizer on cucumber (*Cucumis sativus* L.) production in Port Harcourt (Nigeria). *International Journal of Agricultural Policies and Practices.* 2013; 1(2):028-033.

13. Pandey SK, Singh AB, Singh R, Singh MC. Effect of organic manures and biofertilizers on biomass distribution, growth and yield of okra. *Veg. Sci.*, 2009; 36(3 Suppl.):415-17.
14. Sareedha P, Anburani, Gayathri M. Effect of organic and inorganic nutrients on yield of gherkin (*Cucumis sativus* L.) cv. Ajax hybrid. *South Indian Horticulture*. 2007; 55(1-6):73-77.
15. Singh V, Prasad VM, Kasera S, Singh BP, Mishra S. Influence of different organic and inorganic fertilizer combinations on growth, yield and quality of cucumber (*Cucumis sativus* L.) under protected cultivation. *J of Pharmacognosy and Phytochemistry*. 2017; 6(4):1079-1082.
16. Upaganlawar A, Balaraman R. Protective effects of *Legenaria siceraria* (Molina) fruit juice in isoproterenol induced myocardial infarction. *International Journal of Pharmacology*. 2010; 5:645-651.
17. Yadav SK, Kumar A, Singh R, Singh R. Path coefficient studies and character association in bottle gourd (*Lagenaria siceraria* (Molina) Standl.). *Annals of Hort.*, 2010; 3(1):84-88.