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Effect of biofertilizer on growth and yield attributes of ridge gourd (*Luffa acutangula* L.) under zone-7 of (Davangere, district) Karnataka

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Abstract

An experiment on Ridge gourd (*Luffa acutangula* L.) Effect of Biofertilizer on growth and yield attributes of Ridge gourd (*Luffa acutangula* L.) under zone-7 of Karnataka. The experiment was carried out at Diploma (Agri) College Agricultural and Horticultural Research Station, Kathalagere, Davangere. In kharif season during the year 2022 with three replicated randomized block designs. With seven treatments in 6.5 x 5.5 m plot size twelve plant populations was maintained in each plot with normal spacing given 1.5 x 1.5 m row and plant to plant respectively. The results of the experiment revealed Treatment T₅ (75% NPK + FYM + VC 1250 Kg/ha+ biofertilizer (*Pseudomonas fluorescens* @ 2.50 kg/ha and *Trichoderma viridae* @ 750 g/ha) was shows better results recorded more number of primary branches/shoots (5.45 no) vine length (482.75 cm) Leaves /plant (66.83 Nos) earliest opening of first female flower shows in in DAS (40.58) highest fruit length/diameter also (45.08 /8.26 cm and fruit Yield recorded in (1.45 kg), 15.06 kg) & (4635.89 kg) plant/plot and hector respectively.

Keywords: Biofertilizer, DAS, earliness, fruit weight fruit length fruit diameter, vermicompost

Introduction

Ridge gourd (*Luffa acutangula* L. Roxb.) Ridge gourd is one of the cucurbitaceous photosensitive, climbing vegetable crops it can be grown in tropical and sub-tropical regions of India. It contains a high content of water and nutrients, protein, fat, carbohydrates, minerals, and vitamins, plants need support for growth parameters vine height, Number of shoots Leaf area. Biofertilizers or vermicompost function as key player in sustainable agriculture by improving soil fertility, plant tolerance, and crop productivity current soil management strategies are mainly dependent on inorganic chemical-based fertilizers, which caused a serious threat to human health and environment does not pollute the soil and also does not show any negative effect to environment and human health Sreenivas (*et al.* 2000) ^[20] Thus, there is a need to identify stable nutrients which is suitable for a particular season and location The expression more female flowers emerged of yield is the outcome of interaction of several characters (Venkateshwarlu, 2008) ^[23]. The exploitation of beneficial microbes as biofertilizers has become of paramount importance in agriculture sector for their potential role in food safety and sustainable crop production. To increase the productivity of crops, it is essential to standardize the agro techniques such as optimum nutrients management improve the fruit set, fruit yield, and good quality of fruits. The main objectives of this experiment are to know the suitable ridge gourd nutrients and method of cultivation for obtaining high yield under zone-7 Devanagere district of Karnataka.

Materials and Methods

An investigation carried during the year Rabi Summer 2021 and Kharif 2022 to study the performance of influenced organic, inorganic nutrients, and biofertilizer and Vermicompost inputs. Arka Surjith variety seeds sown in two seasons Spring summer 2021 and Kharif 2022 during the period of summer month provide protective irrigation from Bhadra cannon water in alternate rows and receive un expected or cyclone rain during the crop period. An experiment carried out at College of Diploma Agriculture, Agricultural Research Station, Kathalagere, Davanagere district of Karnataka.

The experimental geographical area is located at 14°16' N latitude, and 75°49' E longitude at an elevation 628 m from mean sea level with annual rainfall of 598 mm. (AHRS, Kathalagere is typical humid and tropical climatic conditions mid suthran zone-7 of Karnataka state). The soil are deep and clay loamy in structure with brown colours moderately acidic to neutral in reaction the available N₂ P₂O₅ and K₂O ranged from 280-235, 24-35.5, and 161-318 kgs /ha respectively. The organic carbon available nitrogen phosphorus and potash, during the period of experimentation, the maximum and minimum temperatures ranged from 33.0⁰ to 39.20 °C & 25.0⁰ to 28.0 °C and 28.0⁰ to 22.0 °C & 25.6 to 21.8⁰ in spring summer and kharif season respectively. The Soil was ploughed with a mould board plough followed by a rotavator applied farm yard manure (12.5t/ha) and fertilizer N: P: K (100:75:50 kg/ha) research were taken in randomized block design with three replications chosen plot size is 6.0 x6.0 m both length and breadth/ maintained in 1.5 m X 1.5 m between the rows and plant to plant. Totally sixteen plants in accommodated each treatment the following treatments are.

1	T ₁ -RDF of NPK (100:50:75.00kg/ha),
2	T ₂ -50% NPK + FYM (18.5 t/ha) + biofertilizer (12.50 Kg/ha)
3	T ₃ -50% NPK+ % + VC (1250 Kg/ha) + biofertilizer 12.50 Kg
4	T ₄ -50% NPK +FYM + biofertilizer (12.50 Kg/ha),
5	T ₅ -75% NPK + FYM +VC (1250 Kg/ha) + biofertilizer (12.50 Kg/ha),
6	T ₆ -50% NPK + FYM +VC+ biofertilizer (12.50 Kg/ha
7	T ₇ -75% NPK + FYM + biofertilizer 12.50 Kg/ha. (<i>Pseudomonas fluorescens</i> @1.0 kg/Ac. and <i>Trichoderma viridae</i> @750 g/hc)

Maintained row spacing weeding was done in 25-day intervals The data were collected randomly from 5 plants Vine length (cm), Primary branches, Fruit length (cm), fruit diameter (cm) no of fruits/plant, average fruit weight (g), days to first female flower opening, days to first harvest, (DAS), and fruit yield kg/plot. The current soil management strategies are mainly dependent on inorganic chemical-based fertilizers, which caused a serious threat to human health and environment. The exploitation of beneficial microbes as biofertilizers has become paramount importance in agriculture sector for their potential role in food safety and sustainable crop production All the agronomic and plant protection measures were adopted as per the recommended package of practices (Prabhakar *et al.*, 2010) [27]. The experimental data were statistically analysed (Panse and Sukhatme, 1978) [28] and compared using critical difference at five percent probability level.

Results and Discussion

Vine length (cm): Vine length was measuring with the help of a meter scale from base level to top end the highest vine length was recorded at 75 days after sowing presented in Table 1 clearly indicated that different treatments significantly influenced all the vine length recorded the treatment T₅ was recorded maximum (482.75 cm) followed by T₆ (475.75 cm) and minimum vine length was recorded in the treatment T₁. (341.22 (cm) Similar results were obtained by Similar findings were reported by Karthick *et al.* (2017) [10, 11] Performance of Ridge Gourd Varieties and Nature of Cultivation for Yield and Yield Attributes.

No of Leaves/plant: Number of leaves, number of vines

were significantly influenced treatment T₅ shows (87.06) on par with T₄-(85.13 Nos) were minimum number of leaves recorded in T₁ (74.06) results are in agreement with the findings of Ananda Murthy *et al.*, 2020 [1] and Asha *et al.*, (2018) [3]. Effect of Biofertilizer on Growth of ridge gourd growth and fruit yield.

No of primary branches/shoots: The perusal of the data clearly indicated that significant differences were significantly influenced by the interaction of biofertilizers. The treatment T₅ were recorded maximum number of primary branches (5.45 Nos) followed by T₆ (5.21 Nos) and minimum primary branches was recorded in the treatments in check T₁ (3.32 no). Similar results were obtained by Kathik *et al.*, (2017) [10, 11] and Nishant Barik *et al.*, 2018 [16]. Significant differences were significantly influenced by the interaction of biofertilizers and vermicompost seed treatment and soil application as resulting highest primary shoot appearance.

Days to first female flower opening: Application vermicompost and biofertilizer the earliness might be also due to the enhanced production of growth which induce the earliness of female flower production, more flower stalks resulting early fruit harvesting. And more number of female flower appearances in minimum number of days taken for first female flower appearance in T₅-(40.58 das) followed by T₆ (42.38 das) and maximum days taken for female flower appearance in check T₁-RDF and recorded (44.14 days). The results are in agreement with the findings have been made observed by Sreenivas *et al.*, (2000) [20] and Ananda Murthy *et al.*, (2020) [1].

Leaf area/plant: The ridge gourd is a photosensitive crop more the leaf area directly proportional to the fruit yield with the help of meter scale by measuring from base level to the growing tip of leaves was recorded. The highest leaf area was recorded in treatment T₅ (4841.12cm²). T₂-(4365.77 cm²) these results were in accordance with) Ananda Murthy *et al* (2020) [1] and Gautam, *et al.*, (2019) [12]. Effect biofertilizer on growth yield of Ridge gourd and Assessment of Vegetative Growth Characteristics and Yield of Different Types of Clusters Bearing Ridge Gourd respectively.

Fruit Characters: Fruit length (cm) leaf area directly proportional to the fruit yield the highest fruit length were recorded at last harvest 8th picking treatment T₅ (47.03) were recorded in maximum fruit length and followed by T₆ on par with the results (46.17 cm) and minimum fruit length was recorded in the treatments in check T₁ (33.69 cm) RDF and FYM (100:50:75 kg/ha) Similar results were obtained by Choudhary, *et al.*, (2014) [1] Evaluation and correlation for growth yield and quality traits of Ridge gourd under arid condition.

Fruit Diameter (cm): Post-harvest physiological and developmental behaviour colour size and shape fruit volume of the fruit observed at the 85% fruit maturity stage fruits can harvested Fruit diameter variability found highest diameter observed in T₅ (8.26 cm) followed by T₆ (8.23 cm) and minimum fruit diameter was recorded in the treatments in check T₁ (7.33 cm). Similar results were obtained by Choudhary, *et al.*, (2014) [1] Evaluation and correlation for

growth yield and quality traits of Ridge gourd under arid conditions.

Average Fruit Weight (g): This may be due to the increase in fruit length and girth fruit weight per plant were recorded at last harvest the treatment were recorded maximum fruit weight in T₅ (186.62 g) similarly on par with T₆ (183.87 g) and minimum fruit weight was recorded in the treatments in check T₁ (165.25 g)). Similar results were obtained by Similar results were obtained Srikanth, *et al.*, (2020) [21]. Mean performance of parents and hybrid and yield quality attributing Character in Ridge gourd. Patel, *et al* (2021) [17] Integrated nutrient management INM on growth and yield of ridge gourd.

Fruit weight per plant: Yield attributes have a positive influence on the yield significant results among the treatments T₅ was recorded highest weight of fruit (1.45 kg), followed by T₆ (1.35 kg), and minimum fruits was recorded in the treatments in check T₁-(1.13 kg). Similar

results were reported Kavitha Choudhary, *et al.*, (2022) [13] Effect of Inorganic fertilizer Organic fertilizer, and Trichoderma on growth yield of Ridge gourd.

Fruit weight per plot (kg): The treatment T₅ were given highest plot weight (15.06 kg), followed by T₆ (14.81 kg) and minimum fruit weight was recorded in the treatments in check T₁ (12.41 kg). Similar results were obtained by Similar results Triveni *et al.*, (2020) [22]. Mean performance of study Ridge gourd Ridge gourd (*Luffa acutangula* L. Roxb.) some Quantities and Qualitative Characters.

Fruit yield kg/ha: The highest fruit yield is directly proportional to the management variety, climatic zone, and biofertilizer combinations treatment T₅ has recorded the heights (4635.89 kg/ha) similarly followed by T₆ (4389.74) and minimum yield were observed in T₁-(3735.38kg/ha). Similar results were reported Kavitha Choudhary, *et al.*, (2022) [13] Effect of Inorganic fertilizer Organic fertilizer and Trichoderma on the growth yield of Ridge gourd.

Table 1: Effect of Biofertilizer on growth parameters of Ridge gourd (*Luffa acutangula* L.) under zone-7, Karnataka.

Sl. No	Treatments	Plant height (Cm)	No of leave/plants	No of vines/ branches	Opening female flower (Day)	Leaf area (Cm ²)/ha
1	T ₁ -RDF of NPK,	341.223	59.860	3.32	44.14	4296.03
2	T ₂ -50% NPK + FYM + biofertilizer	406.847	60.483	3.64	43.82	4290.11
3	T ₃ -50% NPK+% + VC + biofertilizer	428.787	62.417	4.28	43.18	4348.16
4	T ₄ -50% NPK +FYM + biofertilizer	449.117	65.343	4.78	42.9	4448.16
5	T ₅ -75% NPK + FYM +VC + biofertilizer	482.747	66.830	5.45	40.58	4841.23
6	T ₆ -50% NPK + FYM +VC+ biofertilizer	475.457	62.783	5.21	42.38	4460.39
7	T ₇ -75% NPK+% FYM + biofertilizer	417.053	60.493	3.84	43.67	4445.20
Sem.+		11.83	1.85	0.11	1.12	113.00
Cd		35.91	5.63	0.34	3.42	3.45
Cv.%		5.466	5.87	5.22	5.198	5.07

Table 2: Effect of Biofertilizer on yield attributing characters of Ridge gourd (*Luffa acutangula* L.) under zone-7, Karnataka.

Sl. No	Treatments	Fruit length Cm	Diameter of fruit (Cm)	Fruit weight(g)	Yield kg plant	Yield kg /plot	Yield kg/ha
1	T ₁ -RDF of NPK,	37.883	7.333	165.25	1.13	12.41	3735.38
2	T ₂ -50% NPK + FYM + biofertilizer	37.503	8.067	167.62	1.27	12.94	3981.53
3	T ₃ -50% NPK+% + VC + biofertilizer	40.437	7.833	173.28	1.29	13.73	4225.64
4	T ₄ -50% NPK +FYM + biofertilizer	42.620	7.633	182.75	1.21	14.26	4389.74
5	T ₅ -75% NPK + FYM +VC + biofertilizer	45.077	8.267	183.87	1.45	15.06	4635.89
6	T ₆ -50% NPK + FYM +VC+ biofertilizer	44.823	8.233	186.62	1.35	14.81	4559.74
7	T ₇ -75% NPK+% FYM + biofertilizer	38.367	7.500	147.04	1.22	13.45	4139.48
Sem.+		1.19	0.229	4.46	0.02	0.35	110.37
Cd		3.63	0.695	18.53	0.09	1.08	335.09
Cv.%		5.79	5.803	5.12	5.15	5.15	5.159

Conclusion

Overall, treatment T₅, which consisted of 75% NPK, FYM, VC, and bio fertilizer, consistently demonstrated superior performance across various growth parameters and yield attributing characters compared to other treatments. These findings align with previous studies by Karthick *et al.*, 2017 [11] Ananda Murthy *et al.*, 2020 [1], and others, indicating the effectiveness of biofertilizers and organic amendments in enhancing the growth and yield of Ridge gourd.

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