EFFECT OF GREEN MANURING, JEEVAMRUT AND GHAN-JEEVAMRUT ON GROWTH, YIELD, QUALITY AND ECONOMICS OF BANANA cv. GRAND NAINE

Original Research Article

ABSTRACT

The present investigation entitled **“**Effect of green manuring, jeevamrut and ghan jeevamrut on growth, yield, quality and economics of banana (*Musa paradisiaca* L.) cv. Grand Naine**”** was conducted during the year 2023-24 and 2024-25 at Horticulture farm, College of Horticulture, Anand Agricultural University, Anand. The experiment was laid out in a Randomized Block Design with seven treatments. The higher value of fruit yield (90.73 t/ha), number of fingers per hand (17.51), weight of finger (161.01 gram), ascorbic acid (4.53 mg/100 g pulp) were recorded significantly with triple green manuring by dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval and the highest plant height (194.81 cm) and net realization (514186 Rs) with benefit cost ratio (1.91) were significantly found with RDF [FYM: 10 kg/plant, NPK: 300:100:200 g/plant/year]. While minimum days required for shooting was found non-significant result.

Key words: Dhaincha, sunhemp, green manuring, jeevamrut, ghan-jeevamrut

**INTRODUCTION**

Banana (*Musa paradisiaca* L.) is a major fruit crop in India, widely cultivated due to its high nutritional value and economic importance. However, its cultivation relies heavily on chemical fertilizers, which are costly and environmentally harmful. With increasing concerns about soil health and sustainability, there is a need to explore organic nutrient management practices. Organic inputs like green manures and fermented bio-nutrients such as Jeevamrut, Ghanjeevamrut, and Beejamrut offer a promising alternative to chemical fertilizers **(Palekar, S. 2006)**. Therefore, the present study was undertaken to evaluate the effect of green manuring, jeevamrut and ghan-jeevamrut on growth, yield, quality and economics of banana cv. Grand Naine.

**MATERIALS AND METHODS**

The Experiment was conducted at Horticulture Farm, College of Horticulture, Anand Agricultural University, Anand during the year 2023-24 and 2024-25. The experiment was laid out in a Randomized Block Design with seven treatments and repeated thrice. The experimental plot was prepared by deep ploughing and harrowing. Pits of 30 cm3 were dug out by tractor drawn digger at a spacing of 1.8 m × 1.8 m and well decomposed FYM @ 10 kg pit -1 was applied prior to planting in all the treatments. The seeds of dhaincha and sunhemp green manuring were broadcasted insitu between the banana plants as per the experimental treatments Single, Double and triple after 45 to 50 days of sowing, the fully green biomass of the dhaincha and sunhemp produce were incorporated in to the soil by ring method. Banana tissue culture plant was dipped in beejamrut solution for 15 minutes before planting, Ghanjeevamrut applied as a basal dose per pit as per treatment 160, 240 and 320 g/plant, Jeevamrut was incubate for 7 days, then after as per treatment 160, 240 and 320 ml/plant were applied to the plant in every 21 days. The effects of organic nutrient on the yield and quality of bananas were evaluated.

**RESULTS AND DISCUSSION**

**Growth parameters at shooting stage**

**Plant height at shooting stage**

An analysis of the data in Table 2 indicates that recommended dose of fertilizer (FYM: 10 kg/plant, NPK: 300:100:200 g/plant/year) had significantly maximum plant height (194.81 cm). The minimum plant height (166.94 cm) was found with Single green manuring by Sunhemp + ghanjeevamrut 320 g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval] Results were in conformity with respect to increase in plant height was found by Bhoomika *et al.* (2024) by the application of 100 % RDF (FYM: 10 kg plant-1, NPK: 300:90:200 g plant-1 year-1) This increase in plant height due to supply of nutrients in readily available and soluble form with split of nitrogen that plant can absorb them quickly through roots and used them for rapid cell division.

**Days required for shooting**

An analysis of the data in Table 2 indicates that different treatments of green manuring, jeevamrut and ghanjeevamrut showed non-significant result. The minimum number of days required for shooting (267.44) was recorded with RDF (FYM: 10 kg/plant, NPK: 300:100:200 g/plant/year), while maximum days required for shooting (293.07) with Single green manuring by Sunhemp + ghanjeevamrut 320g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval. A similar observation was also recorded Carvalho‑Neta *et al.* (2022) in banana intercropping with lemon grass. due to banana has a long vegetative phase, and slight differences in nutrient regime do not drastically alter the timing of reproductive events. The genetic control and growth physiology dominate over nutritional influence for flowering time or may be all treatments provided sufficient nutrients, and these phenological stages are mainly governed by genetic and climatic factors rather than nutrient levels alone.

**Yield parameters**

**Number of fingers per hand**

An analysis of the data in Table 2 indicates that triple green manuring by dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval resulted significantly maximum number of fingers per hand (17.51). while minimum number of fingers per hand (13.84) recorded with Single green manuring by Sunhemp + ghanjeevamrut 320 g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval. Similar results were found by Bhoomika *et al.* 2024, due to continuous nutrient supply of NPK + micronutrients and higher C/N ratio support flower initiation and ovule development.

**Weight of finger (g)**

An analysis of the data in Table 2 indicates that triple green manuring by dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval resulted significantly maximum weight of finger (161.01 g), while minimum weight of finger (126.09 g) recorded with Single green manuring by Sunhemp + ghanjeevamrut 320 g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval. Similar results were found by Manju and Pushpalatha (2022) in banana cv. Nendran and Bhoomika *et al.* (2024) in banana cv. Grand Naine, This increase in weight of finger with triple green manuring of dhaincha and jeevamrut might sustained nutrients availability throughout fruit development, microbial activity improves nutrient uptake and hormone production, improved soil moisture and root health ensures better translocation of carbohydrates to fruits boosting fruit set and filling. which enhanced physiological and biochemical activities resulting in bigger fruit size.

**Fruit yield (t/ha)**

 An analysis of the data in Table 2 indicates that triple green manuring by dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval] recorded significantly highest values for fruit yield (90.73 t/ha), whereas lowest value was found with Single green manuring by Sunhemp + ghanjeevamrut 320 g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval]. Similar results were found by Bhoomika and Ahlawat (2025) in banana cv. Grand Naine, Meghwal *et al.* (2021) in banana cv. Nendran, Kavitha *et al.* (2022) in banana cv. Ney poovan and Jhade *et al*. (2020) in papaya. It might be due to triple green manuring by dhaincha with ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval repeated improves soil porosity, moisture-holding capacity, maintain **continuous soil fertility and** every incorporation of green manure **recharges soil microbes** and organic matter resulted higher yield attributed parameters contributing higher yield.

**Quality parameter**

**Ascorbic acid (mg/100 g pulp)**

An analysis of the data in Table 1 indicates triple green manuring by dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval obtained significantly higher ascorbic acid (4.53 mg/100 g pulp), whereas minimum ascorbic acid (4.13 mg/100 g pulp) was recorded with RDF (FYM: 10 kg/plant, NPK: 300:100:200 g/plant/year). Similar results were found by Athani and Hulamani (2000) in banana, Marathe *et al*. (2017) in pomegranate, Kumar *et al.* (2017) in mango cv. Dashehari and Patel *et al.* (2020) in mango cv. Amrapali. Due to triple green manuring of dhaincha improved soil fertility, enhanced microbial activity, and optimized plant metabolism, all of which contributed to significantly higher ascorbic acid content in banana pulp

**Economics**

 Economics is a major consideration for the farmers while taking a decision regarding adoption of new technology, hence the cost of cultivation, maximum net realization and benefit cost ratio were computed which was indicated in Table 3. Considering economics of both the years, recommended dose of fertilizer (FYM: 10kg/plant, NPK: 300:100:200 g/plant/year) has the highest net realization i.e. Rs. 514186 with BCR (1:1.91) followed by Single green manuring by Dhaincha+ ghanjeevamrut 320 g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval with net realization i.e. Rs. 481191 and BCR (1:1.79) is due to application cost increases in organic nutrient treatment

**Table 1: Effect of green manuring, jeevamrut and ghan jeevamrut on growth, yield and quality parameters of banana cv. Grand Naine (Pooled data of 2023-24 and 2024-25)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Treatment Details** | **Plant height (cm)** | **Days required for shooting** | **Number of fingers per hand** | **Weight of finger (g)** | **Ascorbic acid (mg/100 g pulp)** |
| **T1** | Triple green manuring by Sunhemp + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval | 170.63 | 289.51 | 14.63 | 128.68 | 4.38 |
| **T2** | Triple green manuring by Dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval | 187.28 | 272.76 | 17.51 | 161.01 | 4.53 |
| **T3** | Double green manuring by Sunhemp + ghanjeevamrut 240 g/plant + soil application of jeevamrut 240 ml/plant at sowing & every 21 days interval | 185.76 | 274.74 | 17.07 | 154.66 | 4.52 |
| **T4** | Double green manuring by Dhaincha + ghanjeevamrut 240 g/plant + soil application of jeevamrut 240 ml/plant at sowing & every 21 days interval | 176.53 | 283.35 | 14.78 | 136.47 | 4.44 |
| **T5** | Single green manuring by Sunhemp + ghanjeevamrut 320g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval | 166.94 | 293.07 | 13.84 | 126.09 | 4.31 |
| **T6** | Single green manuring by Dhaincha+ ghanjeevamrut 320g/plant + soil application of jeevamrut 320 ml/plant at sowing & every 21 days interval | 183.41 | 280.06 | 16.57 | 147.71 | 4.47 |
| **T7** | RDF (FYM: 10kg/plant, NPK: 300:100:200 g/plant/year) | 194.81 | 267.44 | 15.90 | 147.02 | 4.13 |
| **T** | **S. Em. ±**  | 5.27 | 8.37 | 0.50 | 4.10 | 0.06 |
| **C. D. (P=0.05)** | 15.24 | NS | 1.44 | 11.85 | 0.20 |
|  | **C.V. %** | 7.95 | 8.17 | 8.68 | 7.63 | 4.20 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Treatments** | **Fruit yield****(t/ha)** | **Common cost of cultivation (Rs./ha)** | **Treatment cost (Rs./ha)** | **Total cost of cultivation (Rs./ha)** | **Gross realization****(Rs./ha)** | **Net realization****(Rs./ha)** | **Benefit cost ratio** |
| T1 | 63.63 | 268004 | 1,58,105 | 426109 | 954450 | 210191 | 0.78 |
| T2 | 90.73 | 268004 | 1,58,105 | 426109 | 1360950 | 481191 | 1.79 |
| T3 | 84.42 | 268004 | 1,32,528 | 400532 | 1266300 | 443668 | 1.65 |
| T4 | 66.21 | 268004 | 1,32,528 | 400532 | 993150 | 261568 | 0.97 |
| T5 | 59.61 | 268004 | 1,10,108 | 378112 | 894150 | 217988 | 0.81 |
| T6 | 83.51 | 268004 | 1,32,188 | 400192 | 1252650 | 434908 | 1.62 |
| T7 | 83.12 | 268004 | 49,010 | 317014 | 1246800 | 514186 | 1.91 |

**Table 2: Effect of green manuring, jeevamrut and ghan jeevamrut on Fruit yield and economics of banana cv. Grand Naine**

**(Pooled data of yield 2023-24 and 2024-25)**

**CONCLUSION**

* From the two years of experiment, it can be concluded that application of triple green manuring by Dhaincha + ghanjeevamrut 160 g/plant + soil application of jeevamrut 160 ml/plant at sowing & every 21 days interval increased yield, yield parameters and quality parameters of banana cv. Grand Naine. Growth parameter and higher net realization with benefit: cost ratio was observed under of RDF (FYM: 10kg/plant, NPK: 300:100:200 g/plant/year).
* **FUTURE SCOPE**

The present findings indicate that organic nutrient management can significantly enhance banana growth, yield, and quality. Future studies may focus on long-term effects on soil fertility, standardization of organic input doses, economic viability at farm scale, and integration with sustainable cropping systems to promote eco-friendly banana production.

**Conflict of interest**

The authors declare that they have no known financial, personal, or other conflicts of interest that could have appeared to influence the work reported in this paper

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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