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Effect of bunch feeding and bunch spraying on vegetative and yield parameters of tissue culture banana CV. Ney Poovan

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Abstract

The field experiment was conducted during 2017-2018 at College of Horticulture, Mudigere with an objective to know the effect of bunch feeding and bunch spraying on vegetative and yield parameters of tissue culture banana cv. Ney Poovan under hill zone of Karnataka. The banana bunch stalk was fed with different nutrients like urea, sulphate of potash, banana special and organic formulations like panchagavya and Amrutpani. The bunch spraying was done with growth regulator 2,4-D at 30 ppm and compared with control (without bunch feeding and bunch spraying). The results revealed that bunches fed with urea (7.5g)+ SOP(7.5g) along with bunch spraying with 2,4, -D 30 ppm recorded significantly higher bunch length (73.71 cm), internodal length between hands (5.80 cm) finger length (14.92cm), finger girth(38.86mm),finger circumference (12.94 cm), finger weight (88.60g), hand weight(1.36Kg), bunch weight (15.63Kg)and total yield per acre (15.63 t/ha) and total yield per hectare (39.08 t/ha) with a highest benefit cost ratio (3.56) as compare to control.

Keywords: Banana, bunch feeding, bunch spraying, Ney Poovan

Introduction

Banana (*Musa acuminata* L.) belongs to the family Musaceae. It is one of the oldest fruits known to mankind. Banana is the leading fruit crop in tropical and subtropical regions of the world. It is a staple food of millions of people across the globe. Irrespective of their commercial status, banana and plantains are referred as 'Poor man's apple' and it is rich source of easily digestible carbohydrates with a calorific value of 67-137 per 100 g fruit vitamins and minerals and it does not contain fat, cholesterol or sodium. Ney Poovan (Elakkibale) is the choicest diploid cultivar, which is under commercial cultivation on a large scale, especially in hill zone of Karnataka. It is medium tall plant takes 12 -13 months to complete its crop cycle. Fruit is highly fragrant, tasty and firm. Among all the cultivars Ney Poovan fetches higher price in the market due to its good keeping quality.

Banana is a heavy feeder of nutrients and requires continuous supply of nutrients and water in large quantities for its growth, development and yield. Any limitations in the supply of photo synthates at crucial stages affect the bunch size and quality. Because of this problem poor filling and development of finger is often reported in all most all cultivars of commercial importance (Jeyakumar *et al.*, 2010). Banana plant is supplied with nutrients through soil, foliar spray, de-navelling (removal of male inflorescence for nutrient diversion) and post-shoot feeding of nutrients through the distal stalk-end of rachis and bunch spray of various nutrients and growth regulators to achieve higher yields. Usually after shooting the rate of nutrient uptake from the soil decreases hence there is a less scope for soil application of nutrients after shooting, therefore direct application of nutrients through distal stalk and direct bunch spraying may helps in increasing the yield and quality of banana. Hence direct application of nutrients to Banana plants through distal stalk end (bunch feeding) and direct spray of nutrients or growth regulators on bunches are important post-shoot bunch management practices to increase the yield and fruit quality. The present study emphasis on improving the yield of banana cultivar 'Ney Poovan' (AB), which may in turn help to increase national or state economy and increases confidence in farmers to grow quality produce. Keeping these aspects in view, the present investigation "Effect of bunch feeding and spraying on vegetative and yield parameters of tissue culture banana cv. Ney Poovan (AB) under hill zone of Karnataka" is carried out with an objective to know the effect of bunch feeding and spraying on vegetative and yield attributes of tissue culture banana cv. Ney Poovan

Material and Methods

The present investigation was carried out at department of fruit science, College of Horticulture, Mudigere during 2017-18. The principle objective was to study the effect of bunch feeding and bunch spraying on vegetative and yield attributes of tissue culture banana cv. Ney poovan. The primary hardened tissue culture plants were brought from well-maintained private tissue culture laboratory near AHRS, Sringeri. The plants were subjected for secondary hardening in the naturally ventilated poly house and open field condition for 15-20 days and then healthy, vigorous, pest and disease free plants were selected and used for planting. The plots were kept free from weeds by regular weeding. Irrigation schedule was followed according to the requirements. Earthing up was followed whenever soil became compact. De-suckering was done regularly till shooting and a single sucker was allowed to grow after shooting in opposite direction of existing bunch. Along with de-suckering other cleaning activities and plant protection measures were also carried out accordingly. Bunch feeding was done by using fresh cow dung (500g) and water (100 ml) in a polythene bag after the opening of last female hand by removing the male bud (Denavelling). Bunch spray was done three times *i.e.*, first spray at the time of shooting, second at one month after first spray, third spray at two months after first spray. The experiment was laid out in a randomized complete block design (RCBD) with three replications and eight treatments *viz.*,

- T₁- (Control -without bunch feeding and bunch spraying),
- T₂- (Bunch feeding with Urea 7.5 g + SOP 7.5 g),
- T₃- (Bunch feeding with Panchagavya 5% + Amritpani 5%),
- T₄- (Bunch feeding with SOP 7.5g + Banana special 0.2%),
- T₅- (Bunch spray with 2, 4-D 30ppm + T₂-Bunch feeding with Urea 7.5 g + SOP 7.5 g),
- T₆- (Bunch spray with 2,4-D 30ppm +T₃- Bunch feeding with Panchagavya 5% + Amritpani 5%),
- T₇- (Bunch spray with 2, 4-D 30ppm +T₄- bunch feeding with SOP 7.5g + Banana special 0.2%) and T₈-(Bunch spray with 2, 4-D 30ppm)

Results and Discussion

Effect of bunch feeding and spraying on vegetative and shooting parameters

The data on the effect of bunch feeding and spraying on vegetative growth parameters of banana *viz.*, number of leaves per plant, number of functional leaves per plant, plant height and shooting parameters like days taken for complete opening of bunch and days taken for shooting to harvest are furnished in table 1.

Number of leaves at the time of shooting

The data on effect of bunch feeding and spraying on a number of leaves as influenced by bunch feeding and bunch spraying is presented in table 1. There was no significant difference observed among the treatments with respect to number of leaves at the time of shooting. However, the maximum number of leaves (14.22) were recorded in T₄ (Bunch feeding with SOP 7.5 g + Banana special 0.2%) and minimum (13.22) were recorded in T₃ (Bunch feeding with Panchagavya 5% + Amritpani 5%)

Number of functional leaves at the time of shooting

Effect of bunch feeding and spraying on number of functional leaves is presented in table 1. There was no significant

difference observed among the treatments with respect to number of functional leaves at the time of shooting. However, the maximum number of functional leaves (11) were recorded in T₆ (Bunch spray with 2,4-D 30 ppm + T₃- Bunch feeding with Panchagavya 5% + Amritpani 5%) and minimum (9.89) were recorded in T₃ (Bunch feeding with Panchagavya 5% + Amritpani 5%)

Plant height (m)

The data on plant height as influenced by bunch feeding and spraying is presented in table 1. There was no significant difference observed among the treatments with respect to plant height. However, maximum plant height (2.82 m) was recorded in T₅ (Bunch spray with 2, 4-D 30 ppm + T₂- Bunch feeding with Urea 7.5 g + SOP 7.5 g) and minimum (2.58 m) was recorded in T₈ (Bunch spray with 2, 4-D 30 ppm).

Pseudostem girth (cm)

There was no significant difference observed among the treatments with respect to pseudostem girth (Table 1). However, maximum (52.30 cm) pseudostem girth was recorded in T₇ (Bunch spray with 2, 4-D 30ppm + T₄- Bunch feeding with SOP 7.5 g + banana special 0.2%) and minimum (45.60 cm) was recorded in T₄ (Bunch feeding with SOP 7.5 g + banana special 0.2%).

Days taken for complete opening of bunch

Effect of bunch feeding and spraying on days taken for complete opening of the bunches presented in table 1. There was no significant difference observed among the treatments with respect to days taken for complete opening of bunch, however minimum number of days (251.11) was recorded in T₅ (Bunch spray with 2, 4-D 30ppm + T₂- Bunch feeding with Urea 7.5 g + SOP 7.5 g) and maximum number of days (256.33) were recorded in T₁ (Control).

There was no significant difference noticed among the treatments with respect to vegetative growth parameters *viz.*, plant height, pseudostem girth, number of leaves per plant, number of functional leaves per plant and days taken for shooting except days taken for shooting to harvest as these parameters were not affected by bunch feeding and bunch spraying as the treatment implication was done after the initiation of shooting. Similar observations were noticed by Sandhya *et al.* (2016) [22].

Days taken for shooting to harvest

The data pertaining to days taken for shooting to harvest as influenced by bunch feeding and spraying is depicted in table 2. There was a significant difference noticed among the treatments with respect to number days taken for shooting to harvest. The minimum number of days taken for shooting to harvest (121.88 days) were recorded in T₅ (Bunch spray with 2, 4-D 30ppm + T₂-Bunch feeding with Urea 7.5 g + SOP 7.5 g), which was statistically on par (122.78 days), with T₇ (Bunch spray with 2, 4-D 30ppm + T₄- Bunch feeding with SOP 7.5 g + banana special 0.2%) and maximum number of days (129.11 days) taken for shooting to harvest were recorded in control (T₁). This might be due to the faster growth rate of fingers because of absorption of additional nutrients for a faster rate of translocation of assimilates from source to sink aided by additional potassium. Potassium is a general metabolic activator, increasing the respiration and photosynthetic rate (Kumar *et al.*, 2008 [12] in cv. Robusta). Hence, additional potassium application through the bunch

stalk end application induced the early and faster development of bunches. The above findings are in close conformity with the Kumar *et al.* (2008) [12] in cv. Robusta. Further reduction in days taken for shooting to harvest might be due to the presence of nitrogen in urea which increases the auxin concentration in the plant, which might have helped in cell

elongation and in turn enhanced the faster growth rate of the banana spadix. Efficient source-sink relationship may be attributed for minimum number of days for maturity. The above finding was in conformity with Shakila and Manivannan, (2001) [23].

Table 1: Effect of bunch feeding and bunch spraying on vegetative parameters of tissue culture banana cv. Ney Poovan

| Treatment No. | Treatment details | Number of leaves | Number of functional leaves | Plant height (m) | Pseudo stem girth (cm) | Days taken for shooting | Days taken for shooting to harvest |
|----------------|--|------------------|-----------------------------|------------------|------------------------|-------------------------|------------------------------------|
| T ₁ | Control | 13.56 | 10.56 | 2.69 | 48.50 | 256.33 | 129.11 |
| T ₂ | Bunch feeding with Urea 7.5g + SOP 7.5 g | 13.56 | 10.78 | 2.69 | 46.20 | 252.44 | 123.89 |
| T ₃ | Bunch feeding with Panchagavya 5% + Amritpani 5% | 13.22 | 9.89 | 2.64 | 48.00 | 255.78 | 128.11 |
| T ₄ | Bunch feeding with SOP 7.5 g + Banana special 0.2% | 14.22 | 10.78 | 2.64 | 45.60 | 253.67 | 124.22 |
| T ₅ | Bunch spray with 2, 4-D 30 ppm + T ₂ | 13.89 | 10.78 | 2.82 | 48.40 | 251.11 | 121.88 |
| T ₆ | Bunch spray with 2,4-D 30 ppm + T ₃ | 14.11 | 11.00 | 2.75 | 51.30 | 255.22 | 125.56 |
| T ₇ | Bunch spray with 2, 4-D 30 ppm + T ₄ | 13.89 | 10.89 | 2.80 | 52.30 | 252.67 | 122.78 |
| T ₈ | Bunch spray with 2, 4-D 30 ppm | 13.33 | 10.67 | 2.58 | 47.60 | 254.89 | 126.44 |
| | S. Em. + | 0.45 | 0.42 | 0.07 | 1.52 | 1.46 | 0.36 |
| | C D @ 5% | NS | NS | NS | NS | NS | 1.10 |

Effect of bunch feeding and spraying on yield and yield attributing parameters

The parameters like bunch parameters (Bunch length, Internodal length between hands and number of hands per bunch), finger parameters (Number of fingers per hand and bunch, finger length, finger girth, finger circumference and finger weight) and yield parameters (Hand weight, bunch weight, yield per acre and yield per hectare) were studied during the experiment.

Bunch parameters

Bunch length (cm), internodal length between hands (cm) and number of hands per bunch

The results revealed that bunch feeding and bunch spraying has significantly influences the bunch parameters of tissue culture banana cv. Ney poovan (Table 2). Among different treatments T₅ (Bunch spray with 2, 4-D 30 ppm + T₂-Bunch feeding with Urea 7.5 g + SOP 7.5 g) has shown highest bunch length (73.71 cm) and internodal length between hands (5.80 cm) (Table 2). The increased bunch length and internodal length might be due additional supply of potassium which helps in cell division and cell expansion by their effect on RNA and DNA synthesis (Mostafa., 2005) [15]. Similar results were recorded by Shetty *et al.* (2015) [24] in cv. Grand Naine and Kumar and Kumar (2007) [13] in cv. Ney poovan. However, the number of hands per bunch did not differ significantly among the treatments due to effect of bunch feeding and spraying (Data not given). It is mainly due to bunch spraying is done at the time of shoot emergence and bunch feeding after the complete emergence of the bunch, where number of hands in the bunch were decided by the plant before the shoot initiation. Similar results were reported by Nandankumar *et al.* (2011) [18], in cv. Nanjangudu Rasabale (AAB) and Sandhya *et al.* (2016) [22] in cv. Grand Naine.

Finger parameters

Number of fingers per hand and number of fingers per bunch

The bunch feeding and spraying did not have any significant differences among the treatments with respect to number of fingers per hand and per bunch (Data not given). This is

mainly due to the imposition of treatments after the complete emergence of the bunch. Similar results were obtained by Nandankumar *et al.* (2011) [18], in cv. Nanjangudu Rasabale (AAB) with respect to number of fingers per bunch.

Finger length (cm), Finger girth (cm), finger circumference and finger weight (g)

Bunch feeding and bunch spraying has shown significant effect on finger parameters. Significantly higher finger length (14.92cm), finger girth (38.86 mm), finger circumference (12.94 cm), finger weight (88.60 g) was recorded in treatment T₅ (Bunch spray with 2, 4-D 30 ppm + T₂-Bunch feeding with Urea 7.5 g + SOP 7.5 g) (Table 2). The increase in finger length, finger girth, finger circumference might be due to presence of sulphur in sulphate of potash has a synergistic effect with zinc, which is essential for the cell elongation by increasing the cell permeability to water and osmotic solutes of the cells. Besides, auxins are also responsible for inducing the synthesis of specific DNA dependent new m-RNA and specific enzymatic proteins causes increased cell plasticity and extension resulting ultimately in cell enlargement (Ahmed *et al.*, 1998) [1]. Similar findings were also reported by Mustaffa *et al.* (2004) [17], Nandankumar *et al.* (2011) [18] and Kumar and Kumar (2007) [13] in banana. Increase in finger length due to bunch spray with 2,4-D can be attributed to nature of auxins to increase the osmotic pressure of cell sap which is responsible for uptake of water and consequently results in increased growth. Similar results were obtained in banana by Geetha and Nair (2002) [7] in banana and Reddy *et al.* (2012) [21] in pomegranate. The increase in finger weight might be due to the rapid multiplication and enlargement of cells and greater accumulation of sugars or carbohydrates and water in the expanded cells (Kumar and Kumar, 2007) [13] in cv. Ney poovan. The results are in conformity with those reported by Sandhya *et al.* (2016) [22] in banana cv. Grand Naine, Nandan Kumar *et al.* (2011) [18] in cv. Nanjangudurasabale. In a study on the morpho-physiological aspects of finger development it was observed that, in the final stage of development, cell enlargement took place thus reducing the available air space followed by starch filling in the cells. The late application of urea, coinciding with or after the stages of cell division, when the early nitrogen pool

becomes exhausted, may be involved in fruit development as a nitrogen source (Kurien *et al.*, 1999) [14].

Increased finger length and finger girth and other finger parameters due to 2,4-D application can be attributed to its impact on cell development and cell division and mobilization of photosynthetic assimilates to the developing fruits (Mulagund *et al.* 2014) [16]. A role of PGRs in increasing fruit size and weight is caused by increasing both the cell division and cell elongation. In many cases, these factors together affect fruit size. There are two factors affecting cell elongation, one increase in cell wall elasticity that probably is stimulated by auxins and the other one is an increase in cell potassium content needed as an osmoticum for water absorption. Application of 2,4-D increases the fruit size which might be due to increasing carbohydrate absorption, cell development and elongation. Probably, auxin treatments by increasing cell wall elasticity can enhance the cell elongation and development (Harhash and Aloheed, 2005) [8].

Table 2: Effect of bunch feeding and bunch spraying on bunch and finger parameters of tissue culture banana cv. Ney poovan

| Treatment No. | Treatment details | Bunch length (cm) | Internodal length (cm) | Finger length (cm) | Finger girth (mm) | Finger circumference (cm) | Finger weight (g) |
|----------------|---|-------------------|------------------------|--------------------|-------------------|---------------------------|-------------------|
| T ₁ | Control | 64.15 | 4.88 | 11.12 | 30.66 | 10.82 | 65.55 |
| T ₂ | Bunch feeding with Urea 7.5g + SOP 7.5g | 69.93 | 5.33 | 13.84 | 35.43 | 12.31 | 79.63 |
| T ₃ | Bunch feeding with Panchagavya 5%+Amritpani 5% | 66.10 | 4.95 | 12.63 | 32.61 | 11.53 | 72.30 |
| T ₄ | Bunch feeding with SOP 7.5 g +Banana special 0.2% | 69.63 | 5.12 | 13.54 | 34.00 | 12.19 | 75.72 |
| T ₅ | Bunch spray with 2, 4-D 30 ppm + T ₂ | 73.71 | 5.80 | 14.92 | 38.86 | 12.94 | 88.60 |
| T ₆ | Bunch spray with 2,4-D 30 ppm + T ₃ | 69.77 | 5.20 | 13.71 | 34.87 | 12.24 | 78.49 |
| T ₇ | Bunch spray with 2, 4-D 30 ppm + T ₄ | 71.90 | 5.53 | 14.58 | 38.12 | 12.72 | 84.60 |
| T ₈ | Bunch spray with 2, 4-D 30 ppm | 66.90 | 5.13 | 12.90 | 33.49 | 11.86 | 72.59 |
| | S.Em+ | 0.80 | 0.11 | 0.24 | 0.59 | 0.18 | 1.06 |
| | C.D @ 5% | 2.42 | 0.35 | 0.71 | 1.79 | 0.54 | 3.21 |

yield per hectare (37.50 t/ha).Whereas, the control plants which did not receive any additional nutrients through bunch feeding and bunch spraying supplements recorded the lowest hand weight(0.75 kg),bunch weight (10.51 kg), total yield per acre (10.50t/acre)and total yield per hectare (26.25 t / ha) (Table 3).

The increased yield and yield parameters influenced by increase in girth, length and weight of individual fingers. Increase in the weight of hand, weight of bunch and yield per hectare is due to Sulphur present in the sulphate of potash (SOP) has been attributed to play major roles in energy transformation, nitrate assimilation, as a constituent of amino acid and protein production, binding of nucleic acid with proteins, activation of enzymes in carbohydrate metabolism subsequently resulting in greater partitioning of photosynthates in yield attributes of bananas (Ramesh Kumar and Kumar, 2010) [11] and urea has a higher urease activity coincided with better bunch and finger grade which revealed the possibility of conversion or hydrolysis of urea into ammonia (NH₃) and carbon dioxide (CO₂) and its better absorption and assimilation (urease pathway). This enzyme activity, in turn, is related with the molecular absorption of urea (Ancy *et al.*, 1998) [3].

The role of the K⁺ ion in this enzyme activity was stressed by Evans and Sorger (1966). Soluble protein is considered as an indirect measure of Ribulose-1, 5-bisphosphate (RuBp) carboxylase activity as the enzyme constitutes more than 60 per cent of the soluble protein content and hence, it serves as an indicator of the photosynthetic rate (Evans *et al.*, 1975) [6]. RuBp carboxylase, the prime enzyme of carbon fixation is

Effect of bunch feeding and spraying on yield

The bunch management practices like bunch feeding and bunch spraying significantly influences yield of tissue culture banana cv. Ney poovan. The results from the study revealed that treatment T₅ (Bunch spray with 2, 4-D 30 ppm + T₂- Bunch feeding with Urea 7.5 g + SOP 7.5 g) has shown significantly higher hand weight (1.36 Kg), bunch weight (15.63 kg), total yield per acre (15.63 t/acre) and total yield per hectare (39.08 t/ha), Which was on par with T₇ (Bunch spray with 2, 4-D 30ppm + T₄- bunch feeding with SOP 7.5 g + banana special 0.2%)which recorded hand weight (1.27 kg), bunch weight (15 kg)), total yield per acre (15 t/acre) and total yield per hectare (37.50 t/ha).Whereas, the control plants which did not receive any additional nutrients through bunch feeding and bunch spraying supplements recorded the lowest hand weight(0.75 kg),bunch weight (10.51 kg), total yield per acre (10.50t/acre)and total yield per hectare (26.25 t / ha) (Table 3).

dominant in the soluble protein fraction of leaves and therefore is known as the most abundant protein in the world (Noggle and Fritz, 1986) [19]. The present findings of the study are in close conformity with Alagarsamy and Neelakandan (2008) [2] in cv. Robusta. Kumar and Kumar (2010) [11] in cv. Neypoovan, Kumar *et al.* (2008) [12] in cv. Robusta, Bhalariao *et al.* (2009) [4] in cv. Grand Naine and Rao and Swamy (2017) in cv. Grand Naine (AAA)

Bunch feeding with organic formulations like panchagavya and amritpani has also shown a significant increase in yield compared to control. It might be due to the presence of effective microorganisms in panchagavya would have enhanced the synthesis of phytohormones like auxins and gibberellins that might have in turn stimulated the growth by increasing the growth parameters (Ponni and Arumugam, 2007) [20] and also might be attributed to the formation of higher sink capacity by retention of more carbohydrates and also the translocation of carbohydrates from other parts to reproductive parts during development (Duragannavar *et al.*, 2009) [5].

Increase in yield due to bunch feeding and bunch spraying may also due to increase in length, girth, circumference and weight of fingers of the top, middle and bottom hands which resulted in uniform hands which in turn results in increased bunch weight. Similar findings were recorded by Kotur and Murthy (2008) [10] in Robusta.

Effect of bunch feeding and spraying on benefit: cost ratio

The B:C ratio of banana cultivation cv. Ney poovanis depicted in the table 3. Among different bunch feeding and

bunch spraying treatments highest B:C ratio (3.56) was recorded in T₅ (Bunch spray with 2, 4-D 30ppm + T₂-Bunch feeding with Urea 7.5 g + SOP7.5 g) followed by T₇ (Bunch spray with 2, 4-D 30ppm + T₄- Bunch feeding with SOP 7.5 g

+ banana special 0.2%) (3.41) and T₆ (3.16) and T₂ (3.14). Whereas, lowest B: C ratio (2.43) was recorded in T₁ (control).

Table 3: Effect of bunch feeding and bunch spraying on yield parameters and benefit: cost ratio of tissue culture banana cv. Ney Poovan

| Treatment No. | Treatment details | Hand weight (kg) | Bunch weight (kg) | Yield (t/acre) | Yield (t/ha) | Benefit: cost ratio (Rs) |
|----------------|---|------------------|-------------------|----------------|--------------|--------------------------|
| T ₁ | Control | 0.75 | 10.51 | 10.50 | 26.25 | 2.43 |
| T ₂ | Bunch feeding with Urea 7.5 g + SOP 7.5 g | 1.10 | 13.80 | 13.80 | 34.50 | 3.14 |
| T ₃ | Bunch feeding with Panchagavya 5% + Amritpani 5% | 0.85 | 12.20 | 12.21 | 30.53 | 2.80 |
| T ₄ | Bunch feeding with SOP 7.5 g +Banana special 0.2% | 0.99 | 13.63 | 13.63 | 34.08 | 3.10 |
| T ₅ | Bunch spray with 2, 4-D 30 ppm + T ₂ | 1.36 | 15.63 | 15.63 | 39.08 | 3.56 |
| T ₆ | Bunch spray with 2,4-D 30 ppm + T ₃ | 1.04 | 13.70 | 13.80 | 34.50 | 3.16 |
| T ₇ | Bunch spray with 2, 4-D 30 ppm + T ₄ | 1.29 | 15.00 | 15.00 | 37.50 | 3.41 |
| T ₈ | Bunch spray with 2, 4-D 30 ppm | 0.97 | 12.51 | 12.47 | 31.17 | 2.86 |
| | S.Em+ | 0.04 | 0.30 | 0.38 | 0.94 | - |
| | C.D @ 5% | 0.13 | 0.91 | 1.14 | 2.85 | - |

Conclusion

Banana is a gross feeder of nutrients but usually after shooting the rate of nutrient uptake from the soil decreases so there is a less scope for soil application of nutrients after shooting, hence direct application of nutrients to plants through distal stalk end(bunch feeding) and direct spray of nutrients on bunches are important post-shoot bunch management practices to increase the yield. Hence from the results obtained in the present study, it can be concluded that the treatment T₅ (Bunch spray with 2, 4-D 30 ppm + T₂ -Bunch feeding with Urea 7.5 g + SOP 7.5 g) proved to be best for improving yield parameters, post-harvest parameters and for enhancing benefit-cost ratio of tissue culture banana cv. Ney poovan under hill zone of Karnataka.

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