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FOLIAR AND BUNCH NUTRITION ON YIELD OF BANANA CV. NEY POOVAN

R. Jayavalli[1]*, R. Arulmozhiyan[2], P. Saravanapandian[3] and P. Paramaguru[4]

[1]Department of Horticulture, Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, Tamil Nadu, India.

[2]Department of Fruit Science Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, India.

[3]Department of Soil Science &Agricultural Chemistry, Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, Tamil Nadu, India.

[4]Former (Dean), Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, Tamil Nadu, India.

*Corresponding author E-mail : jayavallirajappa@yahoo.co.in

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ABSTRACT

The field experiment was conducted during 2023-24 at Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, India with an objective to assess the effect of foliar and bunch spray nutrition on finger characters, yield of banana 'Ney poovan' under delta region. The experiment was laid out in randomized block design with ten treatments with three replications. Among the different treatments, the treatment T_7 (1% (SOP) +1% urea @ 6 ,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling) significantly improved the bunch weight (18 kg), bunch length (90 cm), bunch breadth (33cm), number of hands (13) per bunch, hands weight (1.24 kg), number of fingers (18) per hand, hands length (17cm), hands breadth (12 cm), finger length (14 cm), finger breadth (6 cm), finger weight (96 gm) and yield 40.81 t/ ha over control T_{10}.

Key words : Banana, Foliar spray, Bunch spray, Ney Poovan, SOP, Urea, Banana Sakthi.

Introduction

India is the largest banana consumer and producing country in the world followed by Brazil, contributing about 15 per cent of the total world production. Among the fruits, banana holds first position in production and productivity in India. It ranks second in area after mango. Banana (*Musa* spp.) belongs to the family Musaceae. Ney Poovan (Elakkibale) is the choicest diploid cultivar, which is under commercial cultivation on a large scale, especially in delta region. It is medium tall plant takes 12 -14 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.

Banana crop receives its last dose of fertilizer after 7th month of planting to fulfil the requirement of nutrients from shooting to harvest stage. Any limitation in the supply of nutrients at this stage leads to poor finger filling and development, reduced bunch size and quality (Jeyakumar *et al*., 2010). However, it is not advisable to go for soil application of fertilizers at finger development stage, because the uptake of nutrients is very slow and low at this stage. Hence, foliar application with fully water-soluble fertilizers at these critical stages increases yield and quality. As uptake of nutrients through the foliage is considerably faster than through roots (Sandhya *et al*., 2018), 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).

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. Direct application of nutrients through distal stalk and direct bunch spray may helps in increasing the yield and quality of banana. Bunch feeding in banana, the technology of enhancing the size of fingers of banana to suit the market demands by de-navelling and feeding of N, K and S through the distal stalk-end of rachis was successfully developed by Navsari Agricultural University Scientists at post-shooting. De-navelling saves mobilization of nutrients and earns additional income when the excised male bud is used as a vegetable. The considerable research work has been done on banana foliar and bunch nutrition on different varieties, but very meagre work has been done on foliar and bunch nutrition in Ney Poovan. Keeping all these factors in consideration the present investigation was undertaken to study the "Foliar and bunch nutrition studies on of banana cv. 'Ney Poovan' (AB)".

Materials and Methods

The present investigation was carried out at Department of Fruit Science, Horticultural College and Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli, Tamil Nadu, India during 2023-24. Foliar spray was done three times @ 6, 7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling. The experiment was laid out in a Randomized block design (RBD) with three replications and ten treatments *viz.*, T_1: 1% Sulphate of potash (SOP), T_2: 1.5% Sulphate of potash (SOP), T_3: 2% Sulphate of potash (SOP), T_4: 1% urea, T_5: 1.5% urea, T_6: 2% urea, T_7: 1% Sulphate of potash (SOP) +1% urea, T_8: 2% banana sakthi urea the above mentioned treatments were imposed 6 ,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling, T_9: 2% Potassium Sulphate (After flowering and thirty days after flowering bunch spray) and T10: control (without foliar and bunch spray). The data on different yield parameters were recorded and was subjected to statistical analysis for meaningful conclusions.

Results and Discussion

Bunch weight (kg)

The bunch parameters like bunch weight (kg), bunch length (cm), bunch breadth (cm), number of hands per bunch, individual hands weight (kg), number of fingers per hand and yield t/ha were studied during the experiment.

The results revealed that foliar spray and bunch spray had significantly influenced the bunch parameters of banana 'Ney poovan' (Table 1). Among all the treatments, the treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) has resulted in the highest bunch weight (18 kg) whereas, the lowest bunch weight (10.50 kg) was reported in T_{10} (untreated control Similar results were found in banana by Kotur and Murthy (2008). Increase in bunch weight is accompanied with the corresponding increase in the number of hands, total number of fingers, finger weight, length and girth as reported by Kumar and Kumar (2007).

Bunch length and breadth (cm)

The data on length and breadth of bunch were significantly influenced by foliar and bunch nutrition (Table 1). The treatment T_7: 1% (SOP) +1% urea @ 6, 7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) reported the highest bunch length and bunch breadth (bunch length 90 cm and bunch breadth 33cm) as against minimum bunch length and breadth (lowest bunch length 70 cm and bunch breadth 24 cm) under in T_{10}: control. Similar results were recorded by Shetty *et al.* (2015) in 'Grand Naine'. Similar results were reported by Nandankumar *et al.* (2011) in 'Nanjangudu Rasabale (AAB)' and Sandhya *et al.* (2016) in 'Grand Naine'.

Number of hands per bunch and number of fingers in hands

The results revealed that, the highest number of hands (13) per bunch and number of fingers (18) fingers per hand under the treated treatment T_7: 1% (SOP) +1% urea @ 6, 7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) and the lowest number of 9 hands per bunch and 14 fingers per hand was recorded in T_{10}: control (Table 1). Potassium increases the cell division and cell expansion by their action on DNA and RNA which to increased internodal length between hands and in turns increased the number of hands per bunch (Mustaffa, 2005).

Hands weight (kg)

The result proved that the highest weight of individual hand (1.24 kg) was observed in treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) as against minimum (0.67 kg) was reported in T_{10} (control) is presented in Table 1. The similar results were reported by Millik *et al.* (2018) in 'Barjahaji' and Patil *et al.* (2018) in 'Grand Naine'.

Hands length (cm) and hands breadth (cm)

Table 1 : Effect of foliar spray and bunch spray on yield and yield attributing parameters.

Treatments	Bunch weight (kg)	Bunch length (cm)	Bunch breadth (cm)	Number of hands per bunch	Hands weight (kg)	Number of fingers per hand
T_1: 1% (SOP)	14	80	32	11	1.12	17
T_2: 1.5% (SOP)	16	80	30	12	1.20	16
T_3: 2 % (SOP)	13	74	29	11	1.03	16
T_4: 1% urea	12	80	27	11	0.97	16
T_5: 1.5% urea	14	80	26	11	1.01	16
T_6: 2% urea	13	80	26	12	1.06	14
T_7: 1% (SOP) +1% urea	18	90	33	13	1.24	18
T_8: 2% banana sakthi	12.50	75	26	11	0.71	16
T_9: 2% Potassium Sulphate (After flowering and thirty days after flowering bunch spray)	10.5	72	25	10	0.69	15
T_{10}: Control	10	70	24	9	0.67	14
Grand mean	13.3	78.10	27.80	11.10	0.97	15.8
SEd ±	0.333	1.534	1.567	0.247	0.015	0.39
CD(P=0.05)	0.7	3.222	3.292	0.518	0.031	0.82
CV%	3.068	2.405	2.462	2.724	1.854	3.025

Hands length (cm), hands breadth (cm), finger length (cm), finger breadth (cm) and finger weight (g) were influenced by foliar and bunch spray significantly on finger parameters.

Hands length and breadth was significantly influenced by foliar and bunch nutrition (Table 2). Among all the treatments, the higher hands length (17 cm) and breath 12cm was recorded in treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) whereas, the minimum hands length (10 cm) and breadth of 8 cm was reported in T_{10} (control). The results of present study are in close conformity with Stamatakis *et al.* (2014).

Finger length

The finger length was significantly influenced by foliar and bunch nutrition (Table 2). Among all the treatments, the highest finger length (14 cm) was recorded in treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) whereas, the minimum finger length (12 cm) was recorded in T_{10} (control). The results of present study are in close conformity with Sarma *et al.* (2014).

Finger girth (cm)

The results on finger girth and diameter were significantly differed among the treatments is presented in Table 2. The treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) had recorded the higher finger girth and diameter (6 cm) whereas the minimum (3.9 cm) was registered in T_{10} (control). Nandankumar *et al*, (2011) in 'Nanjanagudu Rasabale'. Sarma *et al.* (2014) in Borjahaji and Garasangi *et al*. (2018) in Rajapuri. This is due to the presence of sulphur in SOP which had complimentary action with zinc in turn its essential for auxin synthesis. The auxin is responsible for inducing the synthesis of specific DNA dependent new m-RNA and specific enzymatic proteins that increased the cell plasticity resulting ultimately in cell enlargement (Ahmed *et al.*, 1998).

Finger weight (gm)

Finger weight of banana was significantly influenced by foliar and bunch sprays (Table 2). Increased finger weight (96 g) was recorded in treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) whereas, the lowest finger weight (52 g) was recorded in T_{10} (Control). Besides, auxins are also responsible for inducing the synthesis of

Table 2 : Yield characters of banana cv. Neypoovan.

Treatments	Hands length (cm)	Hands breadth (cm)	Finger length (cm)	Finger girth (cm)	Finger weight (gm)	Yield t/ha
T_1: 1% (SOP)	16	10	14	5	82	31.74
T_2: 1.5% (SOP)	15	11	13	5	82	36.27
T_3: 2 % (SOP)	14	10	13	4	72	29.48
T_4: 1% urea	13	10	12	4.5	80	27.20
T_5: 1.5% urea	14	10	13	4.5	72	31.73
T_6: 2% urea	14	10	12	4.5	76	29.47
T_7: 1% (SOP) +1% urea	17	12	14	6	96	40.81
T_8: 2% banana sakthi	12	9	13	4	56	28.34
T_9: 2% Potassium Sulphate (After flowering and thirty days after flowering bunch spray)	11	9	13	4	54	24.67
T_{10}: Control	10	8	12	3.9	52	22.67
Grand mean	13.60	9.9	12.90	4.54	72.2	30.24
SEd ±	0.27	0.23	0.27	0.1	1.5	0.454
CD(P=0.05)	0.57	0.48	0.57	0.20	3.3	0.954
CV%	2.46	2.86	2.58	2.6	2.7	1.839

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).

Yield t/ha

The bunch management practices like bunch spray had significantly influences the yield of banana 'Ney poovan'. The results on yield per hectare was significantly influenced by foliar and bunch nutrition (Table 2). Among all the treatments, the treatment T_7: 1% (SOP) +1% urea @ 6,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling (MAD) had recorded the highest yield per hectare (40.81 t/ha) as against minimum yield per hectare (22.67 t/ha) was recorded in the untreated control.

The increased yield and yield parameters are influenced by increased 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) which 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 and urea has an higher urease activity

T_7: 1% (SOP) +1% urea **T_{10}: Control**

Fig. 1 : Effect of urea and SOP on banana cv. Neypoovan.

coincided with better bunch and finger grade which revealed the possibility of conversion or hydrolysis of urea into ammonia (NH_3) and carbon dioxide (CO_2) 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). The present findings of the study are in close conformity with Alagarsamy and Neelakandan (2008). Increased yield due to bunch feeding and bunch spray was 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 resulted in increased bunch weight.

Conclusion

The results indicated that treatment T_7 1% (SOP) + 1% urea foliar spray @ 6 ,7 and 8 months after planting (MAP) followed by bunch spray after denavelling and one month after denavelling significantly enhanced the yield of banana cv. 'Neypoovan' which attracts the consumers and ensures highest profit (Fig. 1).

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