

Foliar application of secondary nutrients and banana special on bunch and yield of banana cv. Ney Poovan under hill zone of Karnataka, India

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ABSTRACT

The present research was carried out at farmer's field at Kollibyle village, Mudigere taluk, Chikmagalur district during the year 2022-2023. The experiment was laid out in Randomized Complete Block Design comprising of nine treatments with three replications. The results revealed that significantly maximum finger weight (91.70 g), finger length (14.93 cm), finger girth (38.70 mm), hand weight (1.44 kg), number of fingers per hand (14.77), bunch weight (15.51 kg), bunch length (74.02 cm), number of fingers per bunch (163.10) and yield per hectare (38.77 t) was observed in T9- Sulphate of Potash (1%) + Calcium Nitrate (0.25%) + Magnesium Sulphate (0.25%) + Banana Special (0.5%).

Key words: Ney Poovan, Sulphate of potash (SOP), Secondary nutrients, Banana special and yield.

Introduction

Bananas are grown in all tropical regions and play a key role in the economies of many developing countries. In terms of gross value of production, bananas are the world's fourth most important food crop after rice, wheat and maize. They are a staple food and an export commodity. Around 120 nations grow bananas and plantains. India is the world's top producer of bananas, accounting for around 33.40 per cent of all other fruit harvests. It covers about

965,000 hectares in India and produces 34908 thousand MT. It is grown in Karnataka on 129.64 thousand hectares, producing 3430.22 thousand MT.

Ney Poovan is the choicest diploid cultivar, which is under commercial mono cultivation on a large scale especially in Karnataka, Tamil Nadu, Maharashtra and Andhra Pradesh. Banana is a heavy feeder of nutrients and it requires large nutrients for its growth, development, yield and quality of fruits. Crops productivity is usually boosted by the application of chemical nutrients. Plants require seven

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essential micronutrients along with secondary nutrients. Conventionally farmer use only macronutrients, which leads to bias to crop. Visual and hidden micronutrient deficiencies symptoms can be cured by the appropriate use of foliar and basal application of these nutrients. Foliar application of nutrients can rapidly overcome nutritional disorders. These nutrients can be used as foliar at any stage of plant growth and in any quality as per crop need.

Materials and Methods

The field experiment was conducted in farmers field at Kollibyle village, Mudigere taluk, Chikmagalur district to evaluate the effect of foliar application of Secondary Nutrients and Banana Special on Yield of Banana cv. Ney Poovan Under Hill Zone of Karnataka. The experiment was conducted in randomized block design with nine treatments and three replications. The treatment consists of foliar application *viz.*, T₁- Control, T₂- Sulphate of Potash (1%), T₃- Sulphate of Potash (1%) + Calcium Nitrate (0.5%), T₄- Sulphate of Potash (1%) + Magnesium Sulphate (0.5%), T₅- Sulphate of Potash (1%) + Banana Special (0.5%), T₆- Sulphate of Potash (1%) + Calcium Nitrate (0.25%) + Magnesium Sulphate (0.25%), T₇- Sulphate of Potash (1%) + Calcium Nitrate (0.25%) + Banana Special (0.5%), T₈- Sulphate of Potash (1%) + Magnesium Sulphate (0.25%) + Banana Special (0.5%), T₉- Sulphate of Potash (1%) + Calcium Nitrate (0.25%) + Magnesium Sulphate (0.25%) + Banana Special (0.5%) at an interval of one month from 7th months of planting and compared with control.

Biometric observations like finger weight, finger length, finger girth, finger circumference, hand weight, number of fingers per hand, internodal length between the hands, bunch weight, bunch length, number of fingers per bunch, yield per acre and yield per hectare were recorded at the time of harvest the data obtained were analysed statistically.

Results and Discussion

The maximum bunch weight (15.51 kg) was recorded in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %) and minimum bunch weight (10.45 kg) in T₁-Control (Table 1). This might be due to the mobilization of minerals and photo-assimilates from other regions of the plant to growing fruits as well as engagement in cell growth and division, which resulted in increased bunch weight. Fruit set, cell division and cell growth are all aided by auxin. These developmental processes use calcium as a secondary messenger and impact calcium distribution patterns. Foliar calcium feeding resulted in enhanced bunch weight by maintaining a lower level of auxins in various areas, which aided in fruit growth reported by Neethu (2015) in banana cv. Nendran. The outcomes of this study are parallel to the conclusions of Deepa *et al.* (2023) in banana cv. Grand Naine and Ningavva (2014) in banana cv. Grand Naine.

The maximum bunch length (74.02 cm) was obtained in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum bunch

Table 1. Effect of foliar application of nutrients on bunch parameters and yield of banana cv. Ney Poovan

Treatments	Number of fingers per bunch	Bunch weight (kg)	Bunch length (cm)	Yield per acre (tonnes)	Yield per hectare (tonnes)
T ₁	141.7	10.5	63.9	10.5	26.1
T ₂	145.6	11.4	64.3	11.4	28.4
T ₃	147.2	11.8	64.8	11.8	29.5
T ₄	150.6	12.3	65.3	12.3	30.8
T ₅	153.9	12.8	67.2	12.8	32.1
T ₆	156.2	13.2	69.5	13.2	33.1
T ₇	158.1	13.8	69.9	13.8	34.4
T ₈	160.5	15.1	72.5	15.1	37.9
T ₉	163.1	15.5	74.0	15.5	38.8
S. Em. ±	1.8	0.1	0.8	0.2	0.4
C.D. at 5%	5.1	0.4	2.3	0.5	1.3

length (63.92 cm) was observed in T₁- Control and there was a significant difference among treatments (Table 1). The increased length of the bunch might be due to important role of micronutrient in increasing the cell elongation and division reported by Sree *et al.* (2020). Similar results were also reported by Rajamanickam (2021) in banana and Krishnamoorthy and Noorjahan (2017) in banana.

The maximum number of fingers per bunch (163.10) was recorded in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum number of fingers per bunch (141.70) was recorded in T₁- Control (Table 1). The increase in the number of fingers per bunch might be due to potassium application which is attributed to the improvement in vegetative growth of the plant as well as the efficient transfer of photosynthates to the economic part of the plant. These results are in harmony with those obtained by Mustaffa *et al.* (2004) in banana cv. Nendran and Sandhya *et al.* (2016) in banana cv. Grand Naine.

The maximum hand weight (1.44 kg) recorded in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum weight of hand (0.85 kg) was registered in control (T₁) (Table 2). The potassium plays an important role in many biological activities of the plant which reflects on the nutritional status of plant and the sulphur helps in activation of enzymes during carbohydrate metabolism and energy transformation leads to greater accumulation and translocation of carbohydrates to fruits from other reproductive parts during bunch develop-

ment stage. The parallel results were reported by Mustaffa *et al.* (2004) in banana cv. Nendran and Sandhya *et al.* (2016) in banana cv. Grand Naine.

The maximum finger weight (91.70 g) was obtained in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum finger weight (65.18 g) was recorded in T₁-control (Table 2). Increase in finger weight by foliar applications of potassium might be due to the increase in production of promoting endogenous and enhancement of nutrient uptake in addition to the role of potassium on the productivity of banana plants. The previous results are in line with those obtained by Deepa *et al.* (2023) in banana cv. Grand Naine and Sree *et al.* (2020) in banana cv. Grand Naine.

The maximum finger length (14.93 cm) was obtained in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum finger length (11.37 cm) was recorded in T₁-control (Table 2). The maximum finger girth (38.70 mm) was obtained in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %), whereas the minimum finger girth (30.45 mm) was recorded in T₁-control (Table 2). This is due to the presence of sulphur in SOP has a complimentary action with zinc which is essential for auxin synthesis. The auxin is responsible for inducing the synthesis of specific DNA dependent new m-RNA and specific enzymatic proteins that increases the cell plasticity resulting ultimately in cell enlargement (Sathappan *et al.*, 2019). The similar results were noticed by Mustaffa *et al.* (2004) in banana cv. Nendran and Mulagund *et al.* (2015) in banana cv. Nendran.

The maximum yield per acre (15.51 t) and yield per hectare (38.77 t) was obtained in T₉-Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Borax (0.5 %), whereas minimum yield per acre (10.45 t) and yield per hectare (26.12 t) was recorded in T₁-control and there was a significant difference among treatments (Table 1). Higher in fruit yield might be due to the post shooting foliar application of potassium because potassium application causes the accumulation of more food material in the plants and leads to an efficient utilization of the same for development of fruit. It increases the efficiency of metabolic processes of the plant and thus encouraged the growth of plant and fruit. Similar findings were also ob-

Table 2. Effect of foliar application of nutrients on finger and hand parameters of banana cv. Ney Poovan

Treatments	Finger weight (g)	Finger length (cm)	Finger girth (mm)	Hand weight (kg)
T ₁	65.18	11.37	30.45	0.85
T ₂	67.20	12.49	32.40	0.91
T ₃	73.62	12.79	33.59	0.98
T ₄	76.01	13.40	34.63	1.06
T ₅	79.54	13.66	35.54	1.15
T ₆	83.96	14.06	36.30	1.26
T ₇	86.15	14.40	37.11	1.30
T ₈	88.16	14.81	38.30	1.37
T ₉	91.70	14.93	38.70	1.44
S. Em. ±	1.20	0.15	0.60	0.01
C.D. at 5%	3.60	0.44	1.80	0.04

served by Sandhya *et al.* (2016) in banana cv. Grand Naine and Deepa *et al.* (2023) in banana cv. Grand Naine.

Conclusion

From this study it can be concluded that spraying of combination of Sulphate of Potash (1 %) + Calcium Nitrate (0.25 %) + Magnesium Sulphate (0.25 %) + Banana Special (0.5 %) increases the bunch and yield parameters in banana cv. Ney Poovan under hill zone of Karnataka.

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Conflict of interest

Authors declare that no conflict of interest exists.

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