



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(5): 467-469
Received: 01-07-2018
Accepted: 03-08-2018

AM Devkate
MSc Student of Department of
Horticulture, VNMKV,
Parbhani, Maharashtra, India

SV Dhutraj
Assistant Professor of
Horticulture, Banana Research
Station, Nanded VNMKV,
Pabhani, Maharashtra, India

AS Khedikar
MSc Student of Department of
Horticulture, VNMKV,
Parbhani, Maharashtra, India

Effect of foliar application of soluble fertilizer on finger development and yield of banana cv. Grand Naine

AM Devkate, SV Dhutraj and AS Khedikar

Abstract

A field experiment was conducted on the farmer's field at mahmadpurwadi Tal. Vasmata, Dist. Hingoli during 2015-16 to investigate Effect of foliar application of Nand K on finger development and yield of banana Cv. Grand Naine. The experiment was laid out in Randomized Block Design with nine treatment Viz. T₁-2% SOP, T₂SOP, T₃-1%Urea, T₄-2% Urea, T₅-2%SOP+1%Urea, T₆-2%SOP+2%Urea, T₇-3%SOP+1%Urea, T₈-3%SOP=1%Urea, T₉- Control with three replications. The recommended package of practices of banana were plant adopted during investigation. Significantly maximum number of finger per bunch (181.89), length of finger(17.87 cm), weight of finger(142.41g) weight of bunch(25.91kg) and banana yield(115.17mt/ha) was recorded in treatment T₅-i.e. 2%SOP+1% Urea as compared to rest of the treatment under study.

Keywords: Spraying, banana, Grand Naine

Introduction

Banana (*Musa spp.*) is an important fruit crop of tropical countries like India, China, Brazil, Philippines etc, Belongs to Musaceae family and *Musa* genus to the order Zingiberales (Simmonds and Shaphered 1955). The plants are considered as the symbol of prosperity and fertility. Owing to its greater socio-economic significance and multifaceted uses banana is popularly known as *Kalpataru* (A plant with virtues). It is tree that all parts of the plant including leaves, pseudostem, flower bud and corn can be used in one or another way (Chadha, 1974) [3]. In India banana is one of the major and economically important crop, the second largest growing fruit crops that of Mango, occupy 20 per cent area among the total area under crop. Total area under banana crop is 846,000 ha. And total production is 29.12 million Mt. with productivity 34.4 Mt/ha and production share of major fruit crops in India is 33.4 per cent (Anonymous 2016) [1]. Maharashtra is the second highest banana producer state in India, with 4.03 million Metric tonnes production in an area 74,000 ha. With 51.00 Mt/ha productivity and share 15.45 per cent production of total banana production in India (Anon. 2016) [1]. In Marathwada region, total area under banana is 1, 13,288 ha (Anon. 2016) [1] which comprising in Nanded, Parbhani and Hingoli district.

Under traditional farming system, banana crop receive its last dose of fertilizer (nitrogen and potassium) at 7th month after planting to support the requirement of nutrient unit harvest since large quantity of photosynthates are to move from the source to the sink i.e. developing bunches at this phase. Any limitation in the support of nutrients at this crucial stage affect the bunch size and quality. Because of this problem poor filling and development of fingers is often reported in almost all the cultivar of commercial importance. Hence the usefulness of post shooting spray of various nutrients during fruit development in influencing the growth of plant, fruit yield, shelf life and quality of banana. Banana has been found to report well to potash spray supplied through sulphate of potash, potassium nitrate or potassium dihydrogen phosphate. Even though, much research has been done on banana nutrition, but still there is very meager information about tissue culture banana. In view of above, an experiment on "effect of foliar application soluble fertilizer on finger development and yield of banana Cv. Grand Naine"

Material and methods

The present investigation on studies on effect of application of soluble fertilizer on finger development and yield of banana Cv. Grand Naine. The experiment was conducted on the farmer's field at mahmadpurwadi, Tal. Vasmata, Dist. Hingoli during 2015-16. The experiment was conducted in Randomized Block Design with four replication and six treatments.

Correspondence

AM Devkate
MSc Student of Department of
Horticulture, VNMKV,
Parbhani, Maharashtra, India

The recommended dose of fertilizer 200g N, 160g P, 200 g K were used during experimentation. The treatments were undertaken during three different stages of crop growth first spray 180 days after planting, second spray on after shooting and third spray 30 days after 2nd spray. All recommended package of practice were adopted.

Results and discussion

Number of fingers per bunch

The data presented in Table.1 the results obtained for number of finger per bunch had significant influence due to foliar

application of various nutrients. Treatment T5 i.e. foliar application of 2% SOP + 1% urea recorded significantly maximum number of fingers per bunch (181.89), however, it was at par with treatment T6 i.e. foliar application of 2% SOP + 2% urea (177.33), T7 i.e. 3% SOP + 1% urea (174.66). The minimum number of fingers per bunch (152.56) were recorded in T3 i.e. 1% urea. Similar results were obtained by Nandan *et al.* (2011) ^[4] in banana Cv. Nanjangudu Rasbale (AAB) with respect to the number of finger per bunch.

Table 1: Effect of foliar application of soluble fertilizer on finger development of banana

T: No	Treatment Details	Number of fingers/bunch	Weight of finger(g)	Circumference of finger(cm)	Length of finger(cm)	Number of hands/ bunch	Number of fingers per hand
T ₁	2% SOP	168.33	136.33	11.20	16.95	8.33	20.21
T ₂	3% SOP	166.66	135.51	10.50	16.09	8.66	19.24
T ₃	1% Urea	166.11	134.33	11.50	17.03	8.00	20.76
T ₄	2% Urea	166.00	133.22	10.77	15.67	9.00	18.44
T ₅	2% SOP+1% Urea	181.89	142.41	13.73	17.87	8.33	21.83
T ₆	2% SOP+2% Urea	177.33	141.67	13.23	17.11	8.33	21.30
T ₇	3% SOP+1% Urea	174.66	140.11	12.70	17.03	8.33	20.95
T ₈	3% SOP+2% Urea	171.33	139.33	11.13	16.21	8.66	19.78
T ₉	Control	152.56	127.11	9.40	14.33	8.00	19.08
	S.E.+ ₋	3.15	2.37	0.40	0.46	0.31	0.37
	C.D.at 5%	9.49	7.15	1.22	1.37	N.S	1.12

Weight of finger (g)

The results obtained for weight of finger had significant influence due to foliar application of various nutrients. The treatment T5 i.e. foliar spraying of 2% SOP + 1% urea recorded significant maximum weight of finger (142.41g). However, it was at par with treatment T6 i.e. foliar application of 2% SOP + 2% urea (141.67 g), T7 i.e. 3% SOP + 1% urea (140.11 g), T8 i.e. 3% SOP + 2% urea (139.33 g) T1 i.e. 2% SOP (136.33 g) T2 i.e. 3% SOP (135.51 g). The minimum weight of finger (127.11gm) was observed in treatment T9 i.e. control. The increase in finger weight might be due to rapid multiplication and enlargement of cells and greater accumulation of sugars carbohydrate and water in expanded cells.

Circumference of finger (cm)

The results obtained for circumference of finger had significant influence due to foliar application of various nutrients. Treatment T5 i.e. foliar application of 2% SOP + 1% urea recorded significantly maximum circumference of finger (13.73 cm), however, it was at par with treatment T6 i.e. foliar application of 2% SOP + 2% urea (13.23 cm). The minimum circumference of finger (9.40 cm) was recorded in T9 i.e. control. The increase in circumference of finger by 2 per cent SOP might be due to the exogenous potassium supply which acted as an activator of several enzymes, potassium also had a role in synthesizing the precursor of chlorophyll pigments. Similar result was also obtained Ramesh and Kumar (2007) ^[5] in banana Cv. Neypoovan banana Cv. Neypoovan. Singh *et al.* (1991) ^[7] and Sharma *et al.* (1990) ^[6] in Amrapalli and Langra mango respectively.

Length of finger (cm)

The results obtained for length of finger had significant influence due to foliar application of various nutrients. Treatment T5 i.e. foliar application of 2% SOP + 1% urea recorded significantly maximum length of finger (17.87 cm), however, it was at par with treatment T6 i.e. foliar application

of 2% SOP + 2% urea (17.11 cm), T7 i.e. 3% SOP + 1% urea (17.03 cm), T3 i.e. 1% urea (17.03) T1 i.e. 2% SOP (16.95 cm). The minimum length of finger (14.33 cm) was recorded in treatment T9 i.e. control. Similar result was also obtained Ramesh and Kumar (2007) ^[5] in banana Cv. Ney poovan. The nutrient supplied in the form of urea was utilized more for cell elongation of the fruits rather than cell multiplication and the cell enlargement which resulted in more length than girth. The urease activity also coincided with lengthening of fruits as reported by Ancy *et al.* (2000) ^[2].

Number of hands per bunch

The application of various nutrients and combinations showed non-significant differences. The effect of treatment did not differ significantly for number of hands per bunch. However the number of hands per bunch varied from 8.00 to 9.00 among the different treatment of bunch spray.

Number of fingers per hand

The results obtained for number of finger per hand had significant influence due to foliar application of various nutrients. The significantly highest number of finger per hand (21.83) was recorded in treatment T5 i.e. foliar spraying of 2% SOP + 1% urea, however, it was at par with treatment T6 i.e. 2% SOP + 2% urea (21.30), T7 i.e. 3% SOP + 1% urea (20.95), T3 i.e. 1% urea (20.76). The lowest number of finger per hand (19.08) was recorded in T9 i.e. control.

Yield parameter

Weight of bunch (kg)

The data presented in Table 2 significantly maximum weight of bunch (25.91 kg) was recorded in treatment T5 i.e. foliar spraying of 2% SOP + 1% urea, however, it was at par with treatment T6 i.e. foliar spraying of 2% SOP + 2% urea (25.11 kg) and it followed by T7 i.e. 3% SOP + 1% urea (23.87kg), T8 i.e. 3% SOP + 2% urea (23.10 kg). The lowest weight of bunch (20.10 kg) was recorded in treatment T9 i.e. control. The similar results were also obtained by Nandan *et al.* (2011) ^[4] in banana Cv. Neypoovan.

Table 2: Effect of foliar application of soluble fertilizer on yield of banana. Cv Grand Naine

T: No.	Treatment Details	Weight of bunch/ plant(kg)	Yield (Mt/ha)
T ₁	2% SOP	22.95	101.98
T ₂	3% SOP	22.60	100.43
T ₃	1% Urea	22.31	100.03
T ₄	2% Urea	22.11	98.87
T ₅	2% SOP+1% Urea	25.91	115.17
T ₆	2% SOP+2% Urea	25.11	111.58
T ₇	3% SOP+1% Urea	23.87	106.07
T ₈	3% SOP+2% Urea	23.10	102.65
T ₉	Control	20.10	89.32
	S.E.+ ₋	0.48	1.47
	C.D.at 5%	1.46	4.44

Yield (Mt/ha)

There had significant differences for yield among various treatments of nutrients. The significantly maximum yield (115.17 Mt/ha) was recorded in treatment T₅ i.e. foliar application of 2% SOP + 1% urea, however, it was at par with treatment T₆ i.e. foliar application of 2% SOP + 2% urea (111.58 Mt/ha), T₇ i.e. 3% SOP + 1% urea (106.07 Mt/ha) and it was followed by T₈ i.e. 3% SOP + 2% urea (102.65Mt/ha). The lowest yield (89.32 Mt/ha) was recorded in treatment T₉ i.e. control. The increase in yield could be attributed to the change in morphological traits such as reduced pseudostem height, increased pseudostem girth and more number of functional leaves. This is in confirmation with the findings of Nandan *et al.* (2011) ^[4] in banana Cv. Neypooovan Increase in length of finger, circumference of finger, weight of bunch and yield per hectare is due to Sulphur present in the sulphate of potash (SOP) might be responsible for the formation of ferridoxin (Iron-sulphur protein) in plants.

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