



Response of Micronutrient Mixture Application in Banana for Enhanced Growth and Yield

Bindu B

Farming Systems Research Station ,Sadanandapuram,
Kerala Agricultural University, Thrissur 680 656 (Kerala)

ABSTRACT

Banana is one of the most preferred crop gaining popularity in Kerala. Krishi Vigyan Kendra, Kollam conducted an experiment for assessing the effect of foliar and soil application of micronutrient mixtures in banana for yield enhancement. The trial was replicated at ten farmer's field. Different treatments were T₁-Farmers practice, T₂-(recommended dose of fertilizers as per package of practices (190:115:300g NPK/plant/yr) along with Sampoorna KAU multimix at the rate of 10 g /l at 2,4, 6 and 8 m after planting and T₃- (recommended dose of fertilizers (190:115:300g NPK/plant/yr) along with Ayarat at rate of 100 g/plant at 2 and 4 m after planting. The results revealed that soil application of Ayar along with recommended dose of fertilizers resulted in 12.6 per cent yield increase than the foliar application of Sampoorna KAU multimix in banana. Highest yield of 20.6 t/ha was reported from Ayar application in banana followed by Sampoorna KAU multimix (18.3 t/ha) while lowest yield was from farmers practice (14.8t/ha). Farmers practice reported highest pest incidence of 15.6 per cent, followed by application of Sampoorna KAU multimix (6.3 %), while least pest incidence was reported in ayar application (4.1%). Highest BC ratio of 1.94 was noticed in Ayar applied banana followed by 1.71 in Sampoorna KAU multimix application, while least BC ratio of 1.40 from farmers practice.

Key Words : Ayar, Banana, Micronutrients, Sampoorna, Yield.

INTRODUCTION

Banana is an important fruit crop has a great socio-economic significance in Kerala. The crop has also attained wide acceptability among farmers and consumers. Balanced nutrition is very important for high yield, quality and resistance to diseases. Banana is a high nutrient requiring crop. It requires a continuous supply of nutrients at proper growth stages for enhanced yield and productivity. The unscientific crop management practices being followed by farmers led to poor utilization of nutrients and thereby result in low productivity. Due to low organic matter in the soil, introduction of high yielding cultivators and fast growing tissue culture plants, deficiency of micronutrients has become a major problem in banana cultivation. Continuous uptake of nutrients from the soil due to intensive cultivation and unscientific methods

fertilizer application had resulted in reduced nutrient use efficiency and soil degradation (Mahato *et al*, 2016). Micronutrients are often referred to as minor elements and their deficiency or toxicity can reduce plant yield similar to macronutrient deficiency or toxicity. So, an efficient and judicious use of fertilizers along with micronutrient application is essential for attaining higher yield per unit area. It is efficient in correcting both visible deficiencies and hidden hunger of micronutrients. Ayar is a secondary and micro nutrient mixture containing Calcium, Magnesium, Sulphur, Boron and Zinc. Sampoorna KAU multimix for banana is a micronutrient mixture containing Zinc, Boron, Iron, Copper, Manganese and Molybdenum. Keeping this in view, the present study is initiated to find out the response of micronutrient mixture application in banana. This will be useful for

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commercial cultivation and area expansion under Kerala conditions. The study also aimed to equip the farmers in scientific nutrient management of banana and also to evolve a cost effective nutrient management system for banana. Hence Krishi Vigyan Kendra, Kollam during 2016-17, conducted an experiment for assessing the effect of foliar and soil application of micronutrient mixtures in banana for yield enhancement.

MATERIALS AND METHODS

The experiment was conducted during 2016-17 for assessing the effect of foliar and soil application of micronutrient mixtures in banana for yield enhancement. The experiment was replicated at ten farmer's field. Different treatments were T₁-Farmers practice, T₂-(recommended dose of fertilizers as per package of practices (190:115:300g NPK/plant/yr) along with Sampoorna KAU multimix at the rate of 10 g /l at 2,4, 6 and 8 m after planting and T₃-(recommended dose of fertilizers (190:115:300g NPK/plant/yr) along with Ayarat at rate of 100 g/plant at 2 and 4m after planting. Farmers were trained for the foliar application of micronutrient mixtures in banana. Tissue culture plants of banana variety Nendran was used for the experimental purpose. Inter and intra row spacing maintained was 2.0m × 2.0 m. Different biometric and yield parameters were recorded during the study period. Pest and disease incidence were also noted. Bunches were harvested at full maturity as indicated by the disappearance of angles from fingers (Patil and Patil, 2017). The middle finger in the top row of the second hand (from the base of the bunch) was designated as the representative finger or index finger or D finger for studying the fruit characters. Pest and diseases observed in the field were recorded and scoring of them were done following the method adopted by Mahato *et al* (2014).

RESULTS AND DISCUSSION

The results revealed that highest pseudo stem height at 2m, 4m and 6 m after planting was reported in treatment T₃ followed by T₂ and lowest

by T₁. The highest number of functional leaves at 2m, 4m and 6m after planting was reported from T₃ followed by T₂ and lowest by T₁.

Table 1. Effect of micronutrient mixture application on pseudo stem height in banana.

Treatment	2MAP (cm)	4MAP (cm)	6MAP (cm)
T ₁	57.62	150.28	265.37
T ₂	74.13	179.24	285.62
T ₃	77.58	212.36	310.41
CD (0.05)	32.80	85.33	133.10

MAP- Months After Planting

Table 2. Effect of micronutrient mixture application on number of functional leaves in banana.

Treatment	2MAP	4MAP	6MAP	At harvest
T ₁	8.00	9.56	9.46	2.64
T ₂	9.54	10.51	10.12	3.27
T ₃	10.20	10.73	10.52	4.16
CD (0.05)	4.317	4.749	4.638	1.613

MAP- Months after planting

The earliest bunch emergence was noted in T₃ (190.56) and duration for bunch emergence was more in T₁ (210.42). Crop duration was more in T₁(293.47) and lowest in T₃ (272.31). Number of hands/ bunch was more in T₃(5.78) followed by T₂ (5.51) and lowest in T₁(5.10). Number of fingers/ bunch was lowest in (40.12) T₁ and highest in T₃ (58.32). Number of fingers in D hand was highest in T₃(12.0) followed by T₂(28.53 cm) and lowest in T₁(9.43). Patel *et al* (2010) and Mahato *et al* (2016) reported that foliar application of micronutrients like ZnSO₄ (0.50 %) and FeSO₄ (0.50 %) was observed to be the best for increasing bunch length, bunch girth, number of hands/ bunch and yield in banana.

Weight of D finger was highest in T₃ (237.74g) and lowest in T₁(185.81g). While lowest length of D finger was reported from T₁(23.16 cm) and

Response of Micronutrient Mixture Application

Table 3. Effect of micronutrient mixture application on bunch emergence, crop duration, sucker production after bunch emergence, bunch, hand and finger characteristics in banana.

Treatment	Bunch emergence (d)	Crop duration (d)	Number of suckers produced after bunch emergence	Number of hands/bunch	Number of fingers/bunch	Number of fingers in D hand	Weight of D finger (g)	Length of D finger (cm)	Girth of D finger (cm)
T ₁	210.42	293.47	7.52	5.12	40.12	9.43	185.81	23.16	12.26
T ₂	201.11	281.65	9.44	5.51	53.52	11.52	225.00	26.38	13.13
T ₃	190.56	272.31	10.66	5.78	58.32	12.00	237.74	28.53	14.64
CD (0.05)	92.75	130.43	4.34	2.53	24.02	5.13	100.99	12.10	6.19

highest in T₃ (28.53 cm). Highest girth of D finger was noted in T₃ (14.64 cm) followed by T₂ (13.13 cm) and lowest in T₁ (12.26 cm). Similar result was reported by application of Hyfer (foliar fertilizer) at the rate of 3.50 ml/l water/ plantor 60 ml for 16 l along with half the dose of chemical fertilizer was found beneficial in increasing yield parameters of banana like number of hands and weight of hands / bunch.

The highest yield (20.6 t/ha) was reported by T₃, followed by (18.3 t/ha) T₂ and while farmer's practice (T₁) recorded lowest yield (14.8 t/ha). Similar increase in yield attributes by foliar application of 19-19-19 and bunch spray with SOP were recorded by Patel *et al* (2010) and Kumar *et al* (2009), respectively. Highest BC ratio (1.94) was reported from T₃ followed by T₂ (1.71) and lowest by T₁ (1.40). Similar result was obtained by Mayadevi *et al* (2017) noted that higher B : C ratio of 1.94:1 was obtained by foliar application of ZnSO₄ (0.50 %) and FeSO₄ (0.50%) .Highest disease incidence (12.8 %) was reported from T₁ followed by T₂

(5.2%) and lowest from T₃ (3.4%). Highest pest incidence (15.6%) was reported from T₁ followed by T₂ (6.3%) and lowest from T₃ (4.1%).

CONCLUSION

It was concluded that micronutrient application is essential for attaining higher yield in banana. Soil application of Ayar applied at the rate of 100 g/plant at 2 and 4m after planting along with recommended dose of fertilizers as per package of practices (190:115:300g NPK/plant/yr resulted in highest yield (40 t/ha), benefit cost ratio (1.61) and less pest and disease incidence in banana variety Nendran. The highest pseudo stem height and functional leaf number at 2MAP, 4MAP and 6 map was reported from Ayar followed by foliar application of Sampoorana KAU multimix applied at the rate of 10 g/l at 2,4, 6 and 8 m after planting and lowest in farmer's practice. The earliest bunch emergence was also noted in Ayar applied banana. Crop duration was more in farmers practice and lowest in Ayar application. Number of hands/ bunch was

Table 4. Effect of micronutrient mixture application on yield, pest and disease incidence in banana.

Treatment	Yield (t/ha)	B:C Ratio	Pest incidence (%)	Disease incidence (%)
T ₁	14.8	1.40	15.6	12.8
T ₂	18.3	1.71	6.3	5.2
T ₃	20.6	1.94	4.1	3.4
CD(0.05)	8.43	0.79	NS	NS

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more in ayar application followed by Sampoorana application and lowest in farmer practice. Number of fingers/ bunch was lowest in farmer practice and highest in Ayar application. Number of fingers in D hand was also highest in Ayar applied banana .

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