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Micronutrient mixture application in banana cv. Nendran (*Musa* AAB) for yield enhancement

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Abstract
Banana is one of the most preferred crop gaining popularity in Kerala. Krishi Vigyan Kendra, Kollam conducted an experiment in 2016-17 for assessing the effect of foliar and soil application of micronutrient mixtures in banana for yield enhancement. The trial was replicated in ten farmer's field. Different treatments tried under the trial were T_1-Farmers practice, T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix and T_3- (recommended dose of fertilizers as per POP along with Ayar. The results of the trial revealed that soil application of ayar along with recommended dose of fertilizers resulted in 12.6 percent 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%, 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.

Keywords: Banana, micronutrient, yield, foliar application, ayar, sampoorna

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 adopted by farmers led to poor utilization of nutrients and thereby resulted 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. 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.

Keeping this in view, the present study was initiated to find out the response of micronutrient mixture application in banana. Identification and popularization of best performing micronutrient mixture for banana in Kollam district was also aimed at. This will be useful for 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. It is efficient in correcting both visible deficiencies and hidden hunger of micronutrients. The experiment also aimed to develop proper scientific crop management practices for enhanced yield in banana.

Materials and methods
The trial was conducted by Krishi Vigyan Kendra, Kollam during 2016-17 for assessing the effect of foliar and soil application of micronutrient mixtures in banana for yield enhancement. Number of replications involved in the experiment was ten. Different treatments tried under the trial were T_1-Farmers practice, T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix applied at the rate of 10 gl^{-1} at 2, 4, 6 and 8 months after planting})

and T_3- (recommended dose of fertilizers as per POP along with Ayar applied at the rate of 100 g per plant at 2 and 4 months after planting). Sampoorna KAU multi mix for banana is a micro nutrient mixture contains Calcium, Magnesium, Sulphur, Boron and Zinc. Ayar is a secondary and micro nutrient mixture for banana containing Calcium, Magnesium, Sulphur, Boron and Zinc. 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) [5]. 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) [2].

Results and discussion

The results of the experiment are presented in Table 1, Table 2, Table 3, Table 4, Table 5 and Table 6. The results revealed that highest psuedostem height at 2 Month After Planting, 4 Month After Planting and 6 Month After Planting was reported from T_3 followed by T_2 and lowest by T_1. The highest number of functional leaves at 2 Month After Planting, 4 Month After Planting and 6 Month After Planting was reported from T_3 followed by T_2 and lowest by T_1.

Table 1: Effect of micronutrient mixture application on psuedostem height in banana variety Nendran

Treatments	2Months After Planting (cm)	4 Months After Planting (cm)	6 Months After Planting
T_1(Farmer's practice)	57.62	150.28	265.37
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	74.13	179.24	285.62
T_3- (recommended dose of fertilizers as per POP along with Ayar	77.58	212.36	310.41
CD(0.05)	32.80	85.33	133.10

Table 2: Effect of micronutrient mixture application on number of functional leaves in banana variety Nendran

Treatments	2 Months After Planting	4 Months After Planting	6 Months After Planting	At harvest
T_1(Farmer's practice)	8.00	9.56	9.46	2.64
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	9.54	10.51	10.12	3.27
T_3- (recommended dose of fertilizers as per POP along with Ayar	10.20	10.73	10.52	4.16
CD(0.05)	4.317	4.749	4.638	1.613

The earliest bunch emergence was noted in T_3 (190.56 days) and duration for bunch emergence was more in T_1 (210.42 days). Crop duration was more in T_1 (293.47days) and lowest in T_3 (272.31 days). Number of hands bunch^{-1} was more in T_3(5.78) followed by T_2 (5.51) and lowest in T_1(5.10). Number of fingers bunch^{-1} was lowest in (40.12) T_1 and highest in T_3 (58.32). Number of fingers in D hand was highest in T_3 (12.0) followed by T_2 (28.53 cm) and lowest in T_1(9.43). Patel *et al.* (2010)[6] and Mahato *et al.* (2016)[3] reported that foliar application of micronutrients like $ZnSO_4$ (0.50 percent) and $FeSO_4$ (0.50 percent) was observed to be the best for increasing bunch length, bunch girth, number of hands bunch^{-1} and yield in banana.

Weight of D finger was highest in T_3 (237.74 g) and lowest in T_1(185.81g).While lowest length of D finger was reported from T_1(23.16 cm) and highest in T_3 (28.53 cm). Highest girth of D finger was noted in T_3 (14.64 cm) followed by T_2 (13.13 cm) and lowest in T_1(12.26 cm). Similar result was reported by application of Hyfer (foliar fertilizer) at the rate of 3.50 ml l^{-1} water plant^{-1} or 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^{-1} (Torres-Guy, 2011) [7].

The highest yield (20.6 tha^{-1}) was reported by T_3, followed by (18.3 tha^{-1}) T_2 and while farmer's practice (T_1) recorded lowest yield (14.8 tha^{-1}). Similar increase in yield attributes by foliar application of 19-19-19 and bunch spray with SOP were recorded by Patel *et al.* (2010) [6] and Kumar *et al.* (2009) [1] respectively. Highest BC ratio (1.94) was reported from T_3 followed by T_2 (1.71) and lowest by T_1 (1.40). Similar result was obtained by Mayadevi *et al.* (2017) [4] noted that higher B: C ratio of 1.94:1 was obtained by foliar application of $ZnSO_4$ (0.50 percent) and $FeSO_4$ (0.50 percent). Highest disease incidence (12.8 percent) was reported from T_1 followed by T_2 (5.2 percent) and lowest from T_3 (3.4 percent). Highest pest incidence (15.6 percent) was reported from T_1 followed by T_2 (6.3 percent) and lowest from T_3 (4.1 percent).

Table 3: Effect of micronutrient mixture application on bunch emergence, crop duration and sucker production after bunch emergence in banana variety Nendran

Treatments	Bunch emergence (days)	Crop duration (days)	Number of suckers produced after bunch emergence
T_1(Farmer's practice)	210.42	293.47	7.52
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	201.11	281.65	9.44
T_3- (recommended dose of fertilizers as per POP along with Ayar	190.56	272.31	10.66
CD(0.05)	92.75	130.43	4.34

Table 4: Effect of micronutrient mixture application on bunch and hand characteristics in banana variety Nendran

Treatments	Number of hands bunch^{-1}	Number of fingers bunch^{-1}	Number of fingers in D hand
T_1(Farmer's practice)	5.12	40.12	9.43
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	5.51	53.52	11.52
T_3- (recommended dose of fertilizers as per POP along with Ayar	5.78	58.32	12.00
CD(0.05)	2.53	24.02	5.13

Table 5: Effect of micronutrient mixture application on finger characteristics in banana variety Nendran

Treatments	Weight of D finger (g)	Length of D finger (cm)	Girth of D finger (cm)
T_1(Farmer's practice)	185.81	23.16	12.26
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	225.00	26.38	13.13
T_3- (recommended dose of fertilizers as per POP along with Ayar	237.74	28.53	14.64
CD(0.05)	100.99	12.10	6.19

Table 6: Effect of micronutrient mixture application on yield and BC ratio pest and disease incidence in banana variety Nendran

Treatments	Yield (tha^{-1})	B:C Ratio	Pest incidence (%)	Disease incidence (%)
T_1(Farmer's practice)	14.8	1.40	15.6	12.8
T_2- (recommended dose of fertilizers as per POP along with Sampoorna KAU multimix	18.3	1.71	6.3	5.2
T_3- (recommended dose of fertilizers as per POP along with Ayar	20.6	1.94	4.1	3.4
CD(0.05)	8.43	0.79	NS	NS

Conclusion

It was concluded from the study that micronutrient application is essential for attaining higher yield in banana. It helped in correcting the micronutrient deficiency and also resulted in yield enhancement in banana. Soil application of ayar applied at the rate of 100 g per plant at 2 and 4 months after planting along with recommended dose of fertilizers as per POP resulted in highest yield (40 t/ha), benefit cost ratio (1.61) and less pest and disease incidence in banana variety Nendran. The highest psuedostem height and functional leaf number at 2 Month After Planting, 4 Month After Planting and 6 Month After Planting was reported from Ayar followed by foliar application of Sampoorna KAU multimix applied at the rate of 10 gl^{-1} at 2,4, 6 and 8 months 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^{-1} was more in ayar application followed by Sampoorna application and lowest in farmer practice. Number of fingers bunch^{-1} was lowest in farmer practice and highest in Ayar application. Number of fingers in D hand was also highest in ayar applied banana.

References

1. Kumar A, Kumar A, Singh HK, Kumari N, Kumar P. Effect of fertigation on banana biometric characteristics and fertilizer use efficiency. Journal of Agricultural Engineering. 2009; 46:27-31.
2. Mahato SK, Suresh CP, Kuna RK. Effects foliar micronutrient application on growth, yield and fruit quality of plantain cv. Nendran. Plant Archives. 2014; 4:939-944.
3. Mahato SK, Gurung S, Chhetri B, Suresh CP. Effect of inorganic fertilizers and micronutrient application on leaf mineral content of plantain (cv. Nendran) and on the nutritional status of studied soil. International Journal of Environment Agriculture and Biotechnology. 2016; 1:25-30.
4. Mayadevi MR, Sushama PK, Sandeep S. Effects on insitu bio conservation of farm residues on growth and quality of banana cv. Nendran on the laterite soils of Kerala. Journal of Experimental Biology and Agricultural Sciences. 2017; 5:341-350.
5. Patil YJ, Patil VS. Effect of planting material and mode of fertilizer and micronutrient on growth, yield and properties of banana under Western Ghat zone. Vegetos-International Journal of Plant Research. 2017; 3:1-5.
6. Patel AR, Saravaiya S, Patel AN, Desai D, Patel NM, Patel JB. Effect of micronutrients on yield and fruit quality of banana (*Musa paradisiaca* L.) cv. Basrai under pair row planting method. Asian Journal of Horticulture. 2010; 5:245-248.
7. Torres-Guy A. Banana nutrition: A review of principles and practices. Journal of the Science of Food and Agriculture. 2011; 18:177-183.