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# Effect of foliar spray of micronutrient on growth parameter of banana

**T. Balaji, K. Manikandan, P. Veeramani and K. P. Sivakumar**

Krishi Vigyan Kendra, Ramanathapuram, Tamil Nadu Agricultural University, Ramanathapuram district, Tamil Nadu, India.

## ABSTRACT

*The experiment was conducted by the Agricultural Research Station, Tamil Nadu Agricultural University, Vellore district of Tamil Nadu during 2014-15 to study the effect of foliar spray of micronutrients on the growth and yield parameter of Banana. The investigation was carried out in a simple Randomized Block Design with three replications and 12 treatments in the experimental field at Kavasampattu village, Vellore district. The uniform healthy 2 months old sword suckers of cv. poovan were planted in pit at a spacing of 2m x 2m after treating the Carbendazim. The nitrogen and potash were applied in 3 splits i.e at 3,5 and 7th months after planting. The Phosphorus was applied by basal. The Micronutrients viz. Zn(0.5%), Borax (0.1%), Fe (0.2%), and Cu (0.2%) were applied singly or in combination as a foliar spray at 3, 5, and 7th month after planting of suckers. Control plants were sprayed with water only. Recommended plant protection measures and cultural operations were made throughout the period of study. Observation on plant height, leaf number and flowering percentage were recorded at shooting. From the findings of the present investigation, the yield per hectare was significantly higher in high density populations of plant height, number of leaves, and flowering percentage with the application of foliar spray of Zinc (0.5 %) and Boron (0.1%) followed by Boron (0.1 %) and Iron (0.2 %). It can be adopted for a higher yield of banana.*

***Keywords:*** *Foliar nutrition, Micronutrients, Banana*

## INTRODUCTION

Micronutrients are required by plants in minute quantities, although these are very effective in regulating plant growth as they form a part of the enzyme system and thus regulate plant growth as they form a part of the enzyme system and thus regulate plant life. Micronutrients like Cu, Zn, Mo, B, and Mn are necessary for the healthy growth of bananas (Srivastava, 1964). Deficiencies of Zn, Cu, Fe, and Mo affected the growth and production in bananas (Charpentier and Martin, 1965). However, no such research results are available for the new North East zone of Tamil Nadu. Therefore, the present experiment was carried out to study the response of Zn, B, Fe and Cu singly or in combination on the growth, yield and quality of banana.

## MATERIALS AND METHODS

The experiment was conducted in a simple Randomized Block Design with three replications and 12 treatments in the experimental field at Kavasampattu village, Vellore district during 2014-15.The uniform healthy 2 months old sword suckers of cv. poovan were planted in pit at a spacing of 2m x 2m after treating the Carbendazim. Five kg farm yard manure +110g N, 50g $P_2O_5$ and 330g $K_2O$ plant$^{-1}$ were applied. Full dosed of FYM and Phosphate was applied before planting of sucker in the pits. The nitrogen and potash were applied in 3 splits i.e at 3,5 and 7th months after planting. The Micronutrients viz.Zn(0.5%), Borax (0.1%), Fe (0.2%) and Cu (0.2%) were applied singly or in combination as foliar spray at 3, 5 and 7th month after planting of suckers. Control plants were sprayed with water only. Recommended plant protection measures and cultural operations were made throughout study. Observation on plant height, leaf number and flowering percentage were recorded at shooting. Fully developed leaf laminas and soil samples from each plant under different parameters were collected for estimation of Zn,B, Fe and Cu contents at different stages of shooting. The initial soil parameter pH 7.29 and EC 0.11 dSm$^{-1}$ were recorded in soil sample. The soil samples were collected and analyzed for the available nutrient content. It contains 241, 24, 243 Kg/ha of nitrogen, phgosphorus, and potassium respectively. The available micronutrient content was 1.37 ppm manganese, 1.51 ppm iron, 1.67 ppm zinc, 1.1 ppm boron and 0.61 ppm copper in the initial soil sample. The data obtained was statistically analysed for analysis of variance (Cochron and Cox, 1992)

## RESULTS AND DISCUSSION

In Banana crop, there was a linear increase in plant height in all the treatments with the advancement of age from 3rd to 7th month. Significantly differences among the treatments were observed from 3rd month to 7th month. During the all the stages of banana, maximum plant height was noticed in the 159.5 cm in the treatment of foliar application of Zinc and Boron in the 7th month of Banana crop ($T_5$) followed by 157.7cm in the treatment of foliar application of Boron and Iron ($T_8$) while It was minimum plant height was a notice in the treatment of control ($T_{12}$) (Table1).

It has been well documented that the plant height increases with an increase in plant density as reported by Chattopadhyay et al.,(1985) in Giant Governor banana. The results of the present investigation are in conformity with the above findings. It may be due to increased photosynthetic rate and carbohydrate accum ulation as a result of sufficient levels of micronutrients in

**Corresponding Author:* ***T. Balaji***

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the plant system which helped for better plant growth.

Significant differences were noticed among the treatments with respect to number of leaves from 3rd to 7th month. The Number of functional leaves per plant in all the treatments increased linearly with the advancement of age from 3rd month to 7th month (Table 2). The maximum number of leaves (18.6) were found in the treatment of the foliar application of Zinc and Boron in the 7th month of Banana crop ($T_5$) followed by (17.8) in the treatment of foliar application of Boron and Iron ($T_8$) while It was minimum plant height was noticed (13.9) in the treatment of control ($T_{12}$) (Table1).

The increase in a number of functional leaves and leaf area in wider spacing may be due to less competition for moisture and sunlight (Berrill,1963) and hence leaf emergence was reduced under very close planting owing to the lower temperature inside the canopy since temperature had significant influence of leaf emergence. This might have helped in the production of higher leaf area by producing wider leaves (Robinsan and Nel,. 1988) in wider leaves. The highest number of leaves was attributed by nutrient supplementation through foliar application of micronutrients. Further, the results of this investigation are in line with the findings of Singh and Uma (1996).

During the all the ages of Banana crop, significantly difference were observed among the treatments with respect to flowering percentage at 7th month of Banana crop (Table 3), the maximum flowering (68.2 percent) were found in the treatment of foliar application of Boron and Iron ($T_8$) followed by (62.3 percent) in the treatment of foliar application of Zinc and Boron ($T_5$) while It was minimum value of flowering (41.9 percent) was noticed (13.9) in the treatment of control ($T_{12}$).

The results of the present investigation also point out that there was a variation in the growth rate in terms of plant height with the age recording more growth rate during initial stages and less during later stages ( Chacko and Reddy, 1981).

Plant girth increased at wider plant density indicating that plant girth and height of banana are inversely proportional to each other. Similar findings were also reported by Reddy and Singh (1193). The increase in plant girth and number of suckers per plant due to decrease in plant density may be due to the fact that , plant faced less competition for moisture and sunlight in wider spacing (Berrill, 1963), the results of the present study are in accordance with the findings of Ronbinson and Nel (1988) in banana.

## CONCLUSION

From the findings of the present investigation, the yield per hectare was significantly higher in high density populations of plant height, number of leaves and flowering percentage with application of foliar spray of Zinc (0.5 %) and Boron (0.1%) followed by Boron (0.1 %) and Iron (0.2 %). It can be adopted for a higher yield of banana.

***Table .1. Effect of foliar spray application on Plant height at different stages in Banana (cm)***

| Treatments | 3rd Month | 5th Month | 7th Month |
|---|---|---|---|
| T1 -Zn | 82.8 | 132.3 | 153.0 |
| T2- B | 84.9 | 135.3 | 155.7 |
| T3- Fe | 83.8 | 132.3 | 151.0 |
| T4- Cu | 82.1 | 132.4 | 152.1 |
| T5- Zn + B | 85.5 | 138.6 | 159.5 |
| T6- Zn + Fe | 81.9 | 133.6 | 152.8 |
| T7- Zn+Cu | 82.5 | 132.4 | 150.8 |
| T8- B + Fe | 84.5 | 137.4 | 157.7 |
| T9- B +Cu | 82.1 | 131.8 | 151.3 |
| T10- Fe + Cu | 85.03 | 131.9 | 150.4 |
| T11- Zn + B+ Fe+ Cu | 82.27 | 134.8 | 154.4 |
| T12 - Control | 79.83 | 128.5 | 142.5 |
| **SEd** | **0.36** | **0.29** | **0.24** |
| **CD(P-05)** | **0.74** | **0.59** | **0.52** |

***Table .2. Effect of foliar spray application on number of leaves at different stages in Banana***

| Treatments | 3rd Month | 5th Month | 7th Month |
|---|---|---|---|
| T1 -Zn | 6.1 | 8.1 | 16.3 |
| T2- B | 5.4 | 10.6 | 15.8 |
| T3- Fe | 5.3 | 9.9 | 15.7 |
| T4- Cu | 5.5 | 9.7 | 15.3 |
| T5- Zn + B | 7.3 | 12.6 | 18.6 |
| T6- Zn + Fe | 6.2 | 11.5 | 17.4 |
| T7- Zn+Cu | 6.4 | 10.4 | 16.5 |
| T8- B + Fe | 6.9 | 11.5 | 17.8 |
| T9- B +Cu | 5.6 | 10.7 | 16.6 |
| T10- Fe + Cu | 5.3 | 9.7 | 16.3 |
| T11- Zn + B+ Fe+ Cu | 6.3 | 11.6 | 16.7 |
| T12 - Control | 5.1 | 9.5 | 13.9 |
| **SEd** | **0.13** | **1.44** | **0.13** |
| **CD(P-05)** | **0.28** | **2.98** | **0.29** |

***Table .3. Effect of foliar spray application on flowering percentage on 7th month of Banana***

| Treatments | Flowering percentage |
|---|---|
| T1 –Zn | 52.6 |
| T2- B | 57.9 |
| T3- Fe | 51.5 |
| T4- Cu | 53.4 |
| T5- Zn + B | 62.3 |
| T6- Zn + Fe | 52.3 |
| T7- Zn+Cu | 50.5 |
| T8- B + Fe | 68.2 |
| T9- B +Cu | 53.5 |
| T10- Fe + Cu | 53.1 |
| T11- Zn + B+ Fe+ Cu | 54.3 |
| T12 – Control | 41.9 |
| **SEd** | **0.42** |
| **CD(P-05)** | **0.86** |

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