

## **Effect of plant growth regulators and micronutrients on growth, yield and storage life of banana (*Musa spp*) cv. SHRIMANTI**

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Accepted : October, 2008

### **ABSTRACT**

A field experiment was conducted to find out the effect of growth substances, micronutrients and waxol on growth, yield, and storage life of banana (*Musa spp*) cv. SHRIMANTI. Higher concentrations of IAA (80 ppm) and GA<sub>3</sub> (80 ppm) and micronutrients mixture 1% two spray enhanced the height (179.35 cm), pseudostem girth (66.53 cm) and number of leaves (14.35). Early maturity (121.50 days) was introduced with IAA (80 ppm) and GA<sub>3</sub> 80 ppm delayed the maturity. The maximum number of days required for ripening was found with waxol 6 % (25.75 days) and the lowest in micronutrients mixture 1% one spray (10.75 days). Maximum weight of bunch (23.80 kg) was recorded with two sprays of 1% micronutrient mixture, maximum number of hands (9.00) and fingers (136.25) were recorded by IAA 80 ppm. Maximum length (23.00 cm), girth (17.00 cm) and weight of mature finger (185.60 gm) were recorded in micronutrient mixture 1 % with two sprays. It was found that application of IAA 80 ppm, GA<sub>3</sub> 80 ppm and two sprays of 1 % micronutrients mixture were effective for plant growth, finger attribute and yield. Whereas waxol 6% was found effective in keeping quality (storage life).

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**Key words :** Micronutrients mixture, ppm, Foliar application, Ripening, Storage life.

**B**anana *Musa spp* is one of the most important fruit crops grown in India. It is dessert fruit for millions, is used in different regions as staple food owing to its rich and easily digestible carbohydrates. It is rich source of vitamins, minerals and has several medicinal properties. The edible banana is believed to have originated in hot tropical regions of South- East Asia (Spiden, 1926 and Suar, 1952). It is grown across the country in tropical and subtropical region. In Maharashtra total area under banana is 72.20 thousand ha and production is 4.45 million tones. The productivity of banana is 60.00 tonnes ha<sup>-1</sup> being highest in the country (Anony, 2001 b). In India, people prefer fresh fruits instead of canned products. Banana is also one of the fruits, people prefer fresh, the economics of banana depends on the cost of transportation and storage. However, low shelf life and bad transportability are two major problems in case of banana. It is generally harvested when green between 70 to 100 per cent maturity and ripened before consumption (Paul Thomas *et al.*, 1968). Pre harvest and post harvest handling of banana fruits is an important aspect of banana trade. Early and even maturity of bunches are the immediate needs of the banana growers of the region. In view above, an investigation was conducted to find out the effect of plant growth substances and micronutrients on growth, quality and storage life of banana cv. SHRIMANTI.

### **MATERIALS AND METHODS**

A field experiment was conducted at College of Horticulture, Marathwada Agricultural University, Parbhani during 2002-2003. The experiment was laid out in randomized block design with 8 treatments, viz. T<sub>1</sub>- Control, T<sub>2</sub>- GA<sub>3</sub> 40ppm, T<sub>3</sub>-GA<sub>3</sub> 80 ppm, T<sub>4</sub>-IAA 40ppm, T<sub>5</sub>- IAA 80 ppm, T<sub>6</sub>-micronutrients mixture 1 % one spray, T<sub>7</sub>- micronutrients mixture 1 % two spray and T<sub>8</sub>- waxol 6%.

All recommended cultural practices were followed after plantation of banana. The stock solutions of IAA and GA<sub>3</sub> were prepared by dissolving 1 g of respective growth regulator in 50 ml alcohol and added distilled water to make volume of 1 lit. The required concentrations of micronutrients mixture were prepared by directly mixing required quantity of micronutrient mixture in water and spray solutions were used for spraying immediately after preparation. Spray was given at flag leaf stage *i.e.* just before flowering by using a hand sprayer. Growth regulators and micronutrients mixture were sprayed on leaves on both the sides. Precautions were taken to avoid the drizzling of the sprays on the other treatments. After harvesting the Banana, Bunches were completely dipped in 6 % waxol solution for 30 to 40 seconds. Observations were recorded regularly and statistically analysed as per the methods given by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

### *Effect on growth, maturity and ripening:*

It is evident from the data shown in Table 1 that there was significant effect of plant growth regulators and micronutrients on days to harvesting from flowering and days to ripening from harvesting. Non significant influence was noticed in plant height, girth of pseudostem and days to flowering from planting. The highest height of plant (179.35 cm) and maximum number of leaves (14.35) were recorded due to application of IAA 80 ppm, maximum girth of pseudostem was measured in GA<sub>3</sub> 80 ppm (66.53 cm), minimum number of days to flowering

from planting was found due to application of 1% micronutrients mixture one spray (283.00) at flag leaf stage. The lowest values of these attributes are recorded in control. Significantly early maturity was observed due to application of IAA 80 ppm (121.50 days) which was at par with micronutrients mixture 1% one spray (122.75 days) and IAA 40 ppm (123.75 days). The maturity was delayed with the application of GA<sub>3</sub> 80 ppm (131.50 days), treatment GA<sub>3</sub> 40 ppm (129.25 days) and micronutrient mixture 1% two sprays (129.00) which were found at par. These results are confirmed by Narayana and Reddy (1968) on grape, Jadhav and Kadam (1990), Ghanta and

**Table 1 : Effect of plant growth regulators and micronutrients on growth and storage life of banana (*Musa spp*) cv. SHARIMANTI**

Treatment No.	Treatments	Plant height (cm)	Pseudostem girth (cm)	Number of leaves/ plant	Days from planting to flowering	Days from flowering to harvest	Days from harvest to ripening
T <sub>1</sub>	Control	173.96	62.93	12.25	295.50	125.75	11.00
T <sub>2</sub>	GA <sub>3</sub> 40. ppm	173.99	63.18	12.20	298.75	129.25	14.75
T <sub>3</sub>	GA <sub>3</sub> 80 ppm	174.97	66.53	13.60	284.00	131.50	15.25
T <sub>4</sub>	IAA 40 ppm	174.00	65.51	13.55	291.00	123.75	13.25
T <sub>5</sub>	IAA 80 ppm	179.35	65.96	14.35	289.25	121.50	14.75
T <sub>6</sub>	micronutrient mixture 1 % 1 spray	174.80	66.27	12.95	283.00	122.75	10.75
T <sub>7</sub>	micronutrient mixture 1 % 2 spray	176.40	64.5	13.56	289.00	129.00	11.50
T <sub>8</sub>	Waxol 6 %	171.90	63.97	13.05	293.25	128.75	25.75
S.E. ±		3.32	2.25	0.82	4.12	2.18	1.14
C.D. (P=0.05)		N.S.	N.S.	N.S.	N.S.	6.40	3.37

**Table 2 : Effect of plant growth regulators and micronutrients on yield and storage life of banana (*Musa spp*) cv. SHARIMANTI**

Treatment No.	Treatments	Weight of bunch (kg)	Number of hands/ bunch	Number of fingers/ bunch	Length of finger (cm)	Girth of finger (cm)	Weight of mature finger (g)
T <sub>1</sub>	Control	18.18	7.50	110.50	20.50	13.50	164.52
T <sub>2</sub>	GA <sub>3</sub> 40 ppm	21.00	8.75	126.00	21.25	14.85	166.66
T <sub>3</sub>	GA <sub>3</sub> 80 ppm	22.00	9.00	128.00	22.80	15.75	171.87
T <sub>4</sub>	IAA 40 ppm	21.00	8.50	127.25	21.00	15.75	165.35
T <sub>5</sub>	IAA 80 ppm	23.58	9.00	136.25	22.25	16.50	173.38
T <sub>6</sub>	micronutrient mixture 1 % 1 spray	23.10	8.25	127.75	21.25	16.00	180.82
T <sub>7</sub>	micronutrient mixture 1 % 2 spray	23.80	8.75	128.50	23.00	17.00	185.60
T <sub>8</sub>	Waxol 6 %	18.75	7.75	123.25	20.00	13.60	152.12
S.E. ±		1.06	0.30	6.06	0.46	0.26	1.63
C.D. (P=0.05)		3.14	0.90	17.82	1.37	0.79	4.80

Mitra. (1993), Pertin and Das. (1996), while working on banana.

The data presented in Table 1 in respect of days to ripening from harvesting was significant. Micronutrient mixture 1% two sprays (11.50 days), control (11.00 days) and micronutrient mixture 1% one spray (10.75 days) reduced the time required for ripening; however, these treatments were at par. Highest period required for ripening (storage life) was found with woxol 6 % (25.75 days) which was superior over all the treatments. Next maximum number of days required for ripening was found in GA<sub>3</sub>80 ppm (15.25 days) followed by GA<sub>3</sub> 40 ppm (14.75 days), IAA 80 ppm (14.75 days) and IAA 40 ppm (13.25 days) which were at par with each other. Similar results were reported by Jadhav and Kadam, (1990), Chellapan, (1983) and Sarkar *et al.* (1995).

#### **Effect on yield and finger attributes:**

The data presented in Table 2 show that the results were significant for weight of bunch and number of hands per bunch. The highest bunch weight was obtained with two sprays of 1 % micronutrient mixture (23.80 kg) which was statistically similar to IAA 80 ppm (23.58 kg), micronutrient mixture 1 % one spray (23.10 kg), GA<sub>3</sub> 80 ppm (22.00 kg), and minimum was recorded in control (18.18 kg). IAA 80 ppm (9.00) and GA<sub>3</sub> 80 ppm (9.00) recorded highest number of hands per bunch and lowest was recorded in control (7.50).

Maximum number of fingers per bunch was recorded with IAA 80 ppm (136.25) and minimum was found in control (110.50). Remaining treatments produced statistically similar number of fingers per bunch. The maximum length of finger was found with two sprays of 1 % micronutrient mixture (23.00 cm) followed by GA<sub>3</sub> 80ppm (22.80 cm), IAA 80ppm (22.25 cm) which were at par and lowest was recorded in waxol 6% (20.00). The maximum girth of finger was recorded in two sprays of 1 % micronutrient mixture (17.00 cm) and IAA 80 ppm (16.50 cm) which were at par with each other and minimum girth was found in control (13.50 cm).

Maximum increase in weight of mature finger was found in two sprays of 1 % micronutrients mixture (185.60 g) and one spray (180.82 g). These treatments were at par with each other. Next maximum weight of mature finger was found in IAA 80 ppm (173.38 g) GA<sub>3</sub> 80 ppm (171.87 g) and these treatments were statistically similar, minimum weight of finger was recorded in waxol 6% (152.12 g). Similar results were reported by Parmar and Chundawat (1981), Chattopadhyay and Jana (1982), Ghanta and Dwivedi (1993) and Ghanta and Mitra (1993).

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