

## STAGGERING OF FRUIT PRODUCTION IN PINEAPPLE VAR. MAURITIUS

A. K. Baby Latha, S. Ramachandran Nair and P. C. Sathya Varma

Kerala Horticulture Development Programme, Vellanikkara 680 654, Trichur, India

**Abstract:** Studies were undertaken to find out the feasibility of producing pineapple fruits of var. Mauritius throughout the year by adjusting the time of planting and growth regulator application. From the results it was observed that pineapple var. Mauritius can be planted throughout the year and harvesting is possible all the 12 months by adjusting the time of application of growth regulator. However, planting in August was the best as far as the fruit weight with crown as well as without crown is concerned. The fruit size was found to be significantly reduced by applying the growth regulator at six months after planting. The reduction in fruit size may be correlated to the reduced number of leaves in the treatment plants at the time of application, irrespective of the time of planting. The best time for application of growth regulator was found to be at eight months after planting.

**Key words:** Growth regulator, Mauritius, pineapple, time of planting.

### INTRODUCTION

Pineapple (*Ananas comosus* [L] Merr.) is a choice fruit of India possessing a characteristic pleasant flavour and taste. The two important varieties of the crop grown in Kerala are Kew and Mauritius. Of late, the variety Mauritius is gaining more importance than Kew in Kerala occupying over 50% of the area under this crop. Preliminary survey conducted by the Kerala Agricultural University at the Vazhukulam area of Ernakulam district, the most potential pineapple growing tract of Kerala, during 1994, revealed that Mauritius is more preferred as a table fruit and for juice making. Phenomenal increase in area and production of Mauritius pineapple has occurred in Ernakulam, Idukki and Kottayam districts during the last two to three years. Literature shows that although most of the agro-techniques have been standardised for pineapple, almost all the works were conducted with Kew variety. No systematic research work on any aspect of cultivation could be traced for Mauritius variety especially on the time of planting or time of growth regulator application. Investigations were therefore carried out to find out the feasibility of Mauritius pineapple production throughout the year by adjusting the time of planting and application of growth regulator.

### MATERIALS AND METHODS

The experiment was conducted at the fields of Kerala Horticulture Development Programme,

Kerala Agricultural University Campus, Trichur during 1994. The treatments included four time of planting of pineapple namely, May 15 (P<sub>1</sub>), August 15 (P<sub>2</sub>), November 15 (P<sub>3</sub>), and February 15 (P<sub>4</sub>). For each time of planting, the growth regulator was applied at three periods namely, six months after planting (T<sub>1</sub>), seven months after planting (T<sub>2</sub>) and eight months after planting (T<sub>3</sub>). Thus, altogether there were 12 treatment combinations laid out in a factorial randomised block design with three replications. Each treatment combination had 30 plants planted in two rows in each trench. All the cultural practices were given as per the package of practices recommendations of the Kerala Agricultural University (KAU, 1993). Flowering was induced by applying 25 ppm ethephon + 2% urea + 0.04% CaCO<sub>3</sub>. Observations were recorded on vegetative and fruit characters.

### RESULTS AND DISCUSSION

The data on vegetative and fruiting characters of pineapple var. Mauritius as affected by different time of planting and application of growth regulator are presented in Table 1. The interaction effects are given in Table 2. With respect to height and number of leaves after three months of planting, there was no significant difference between the different treatments. However, the height at the time of growth regulator application was significantly affected by different time of planting. The height was maximum for February planting which was significantly higher than the other

Table 1. Effect of time of planting and growth regulator application on vegetative and fruit characters of pineapple var. Mauritius

Treatments	Height (3MAP) cm	No. of leaves (3MAP)	Height (GRA) cm	No. of leaves (GRA)	Days for: flowering	Fruit weight kg	Fruit wt without crown kg	Crown weight kg	Fruit length cm	Fruit girth cm	Fruit breadth cm	Duration days
Time of planting												
P <sub>1</sub>	71.28	20.51	92.73	36.68	33.14	1.250	1.053	0.207	15.88	37.00	10.03	363.58
P <sub>2</sub>	71.83	23.41	88.84	37.16	34.08	1.487	1.258	0.229	17.89	35.97	10.40	361.41
P <sub>3</sub>	71.61	22.30	92.31	34.17	35.88	1.306	1.088	0.218	16.90	35.92	10.78	360.86
P <sub>4</sub>	73.89	23.66	102.84	31.98	36.53	1.403	1.244	0.158	19.82	35.67	11.03	370.62
CD(0.05)	NS	NS	4.70	NS	0.56	0.071	0.095	0.042	1.07	NS	0.36	2.89
Time of growth regulator application												
T <sub>1</sub>	72.56	22.79	85.51	29.56	33.75	1.243	1.034	0.217	15.50	36.28	10.37	334.40
T <sub>2</sub>	71.53	22.70	94.61	36.19	33.84	1.375	1.181	0.194	18.20	36.03	10.46	364.96
T <sub>3</sub>	72.36	21.92	102.44	39.24	37.13	1.466	1.267	0.199	19.18	36.11	10.86	392.99
CD(0.05)	NS	NS	4.07	0.853	NS	0.062	0.082	NS	0.92	NS	0.31	2.50

\* MAP - Months after planting; GRA - At growth regulator application

three times of planting. Among the three times of application of growth regulator, application eight months after planting recorded maximum height, which was significantly superior to application seven months as well as six months after planting. The interaction effect (Table 2) for height was found to be non-significant. The number of leaves at the time of growth regulator application was not affected by different time of planting. However, the leaf number was affected significantly by the time of application of growth regulator. Growth regulator application eight months after planting recorded the maximum number of leaves (39.24) which was significantly superior to other time of applications. The number of leaves was significantly lower in the treatment i.e., growth regulator application six months after planting. The interaction effect (Table 2) showed that maximum number of leaves were produced by planting in August and applying growth regulator at eight months after planting (42.68) which was on par with planting in May and applying growth regulator at eight months after planting (42.39).

The lowest number of leaves was produced for May planting and application of growth regulator six months after planting (27.44) which was on par with planting in August and applying growth regulator at six months after planting (30.07).

It is possible to harvest pineapple fruits throughout the year by adjusting the time of planting and application of growth regulator (Table 1 & 2). Harvesting was done all the 12 months starting from April, 1995. Studies carried out at the Pineapple Research Station, BCKV, West Bengal during 1976-80 revealed that in order to harvest pineapple throughout the year, slips of pineapple should be planted from July to December and ethrel should be applied between 335 and 385 days after planting (Bose *et al.*, 1983). Flowering can be induced in pineapple var. Mauritius throughout the year by the application of ethephon. Cent per cent flowering was obtained for all the treatments. However, there was some difference in the number of days taken for flowering. The February planting recorded the

Table 2. Interaction effect of time of planting and growth regulator application on vegetative and fruit characters of pineapple var. Mauritius

Treatments	Three months after planting		At GR application		Days for flowering	Fruit weight, kg
	Height, cm	No. of leaves	Height, cm	No. of leaves		
P <sub>1</sub> T <sub>1</sub>	70.67	20.33	85.30	27.44	29.50	1.100
P <sub>1</sub> T <sub>2</sub>	72.21	20.80	88.69	40.22	34.43	1.230
P <sub>1</sub> T <sub>3</sub>	70.97	20.41	104.22	42.39	35.50	1.419
P <sub>2</sub> T <sub>1</sub>	72.48	23.26	77.73	30.07	34.67	1.230
P <sub>2</sub> T <sub>2</sub>	71.91	24.83	90.73	38.72	33.40	1.596
P <sub>2</sub> T <sub>3</sub>	71.09	22.14	98.07	42.68	34.17	1.634
P <sub>3</sub> T <sub>1</sub>	71.11	22.65	80.20	31.53	37.07	1.285
P <sub>3</sub> T <sub>2</sub>	71.65	22.46	94.87	33.67	34.87	1.276
P <sub>3</sub> T <sub>3</sub>	72.06	21.79	101.87	37.30	35.70	1.357
P <sub>4</sub> T <sub>1</sub>	76.00	24.93	98.80	29.20	33.80	1.355
PJ,	70.33	22.72	104.13	32.13	32.67	1.397
P <sub>4</sub> T <sub>3</sub>	75.33	23.33	105.60	34.60	43.13	1.456
CD (0.05)	NS	NS	NS	1.70	NS	0.123

\*GR - Growth regulator

Table 2 contd.

Treatments	Fruit wt.(kg) without crown	Crown weight, kg	Fruit length cm	Fruit girth cm	Fruit breadth, cm	Harvesttime	Duration, flays
P <sub>1</sub> T <sub>1</sub>	0.959	0.171	13.68	37.36	9.60	April 1995	335.73
P <sub>1</sub> T <sub>2</sub>	1.040	0.190	16.35	35.91	9.63	May 1995	360.80
P <sub>1</sub> T <sub>3</sub>	1.158	0.260	17.61	37.74	10.87	June 1995	394.20
P <sub>2</sub> T <sub>1</sub>	1.000	0.229	14.29	35.70	10.23	July 1995	324.80
P <sub>2</sub> T <sub>2</sub>	1.364	0.232	18.62	36.32	10.27	Aug. 1995	364.43
P <sub>2</sub> T <sub>3</sub>	1.407	0.227	20.77	35.88	10.70	Sept. 1995	395.00
P,T,	1.005	0.250	15.92	36.01	10.77	October 1995	338.30
P <sub>3</sub> T <sub>2</sub>	1.064	0.212	16.81	36.55	10.77	Nov. 1995	362.50
P <sub>3</sub> T <sub>3</sub>	1.195	0.162	17.98	35.21	10.80	Dece. 1995	381.77
P <sub>4</sub> T <sub>1</sub>	1.168	0.186	18.10	36.07	10.87	January 1996	338.77
P <sub>4</sub> T <sub>2</sub>	1.257	0.140	21.03	35.33	11.16	February 1996	372.10
P <sub>4</sub> T <sub>3</sub>	1.308	0.148	20.34	35.60	11.07	March 1996	401.00
CD (0.05)	NS	0.07	1.85	NS	NS	-	5.00

maximum number of days for flowering (36.53 days) and May planting recorded the minimum

number of days for flowering (33.14 days) which was significantly superior to other

treatments. The time of application of growth regulator or the interaction effect did not significantly affect the number of days for flowering. Balakrishnan *et al.*, (1978) recommended the application of ethrel alone or in combinations during different times of the year to get flowering in pineapple var. Kew throughout the year. However, according to them, maximum percentage of flowering was obtained during October, November and December. In the present studies no such seasonal behaviour for ethrel was observed. This may be attributed to the varietal difference.

Regarding the fruit weight with crown, there was significant difference between the four time of planting. The time of application of growth regulator and also the interaction effect was found to be significant for this character. Maximum fruit weight was recorded by August planting (1.487 kg) which was significantly superior to the other treatments. The May planting recorded the lowest fruit weight (1.250 kg). Regarding the time of application of growth regulators, application eight months after planting recorded the maximum fruit weight (1.466 kg). The interaction effect for fruit weight was also significantly affected by the time of planting and application of growth regulator. Maximum fruit weight was recorded by planting in August and application of growth regulator at eight months after planting (1.634 kg) which was on par with planting in August and application of growth regulator at seven months after planting (1.596 kg). The next best treatments were, planting in February and applying growth regulator at eight months and seven months after planting (1.456 kg and 1.397 kg) as well as planting in May and applying growth regulator at eight months after planting (1.419 kg). The fruit weight without crown was significantly affected by different time of planting and growth regulator application. Maximum weight was recorded by August planting which was on par with February planting. The fruit weight without crown was also affected by time of application of growth regulator. Maximum fruit weight without crown was obtained by growth regulator application at eight months after planting

which was significantly superior to other applications. The interaction effect was found to be non-significant. The crown weight was found to be significantly affected by different time of planting. Planting in February produced the lowest crown weight (0.158 kg) which was significantly lower than other time of planting. The time of application of growth regulator did not affect the crown weight. The interaction effect on crown weight was also found to be significant. Lowest crown weight was recorded by planting in February and applying growth regulator at seven months after planting (0.140 kg). In the studies conducted at the Pineapple Research Centre, Vellanikkara, Trichur it was found that fruit weight was significantly higher in May and July plantings for Kew pineapple. The crown weight was minimum in May planting. May planting and hormone application at 16 months after planting was recommended for Kew pineapple in their studies (KAU, 1995). The differential response obtained in the present study may be attributed to varietal difference, especially in the duration of the crop. The average duration of Kew is about 22-24 months, while that of Mauritius is about 11-13 months.

The fruit length was found to be maximum for February planting which was significantly superior to other time of planting. Fruit length was also significantly affected by the time of application of growth regulator. Maximum fruit length was produced when growth regulator was applied at eight months after planting (19.18 cm) which was significantly superior to other applications. The interaction effect showed that the length of fruit was highest in February planting and applying growth regulator seven months after planting which was on par with planting at the same time and applying growth regulator at eight months after planting as well as planting in August and applying growth regulator at eight months after planting. The fruit girth was not affected by the time of planting or the time of growth regulator application. Fruit breadth was maximum for February planting and among the time of application of growth regulator, fruit breadth was maximum for the application

eight months after planting. The interaction effect was not significant. Total duration of the crop was significantly affected by different treatments. February planting recorded the maximum duration (370.62 days). The time of application of growth regulator also affected significantly the duration of the crop. Application six months after planting recorded the minimum duration (334.40 days) which was significantly superior than other time of application. The interaction effect was also found to be significant with regard to duration. The duration was minimum for August planting and application of growth regulator six months after planting (324.8 days). The planting in February and applying growth regulator at eight months after planting took maximum days (401.0 days) as far as duration is concerned.

From the present study it is concluded that pineapple var. Mauritius can be planted during different seasons of the year and harvesting is possible throughout the year by adjusting the time of application of growth regulator. However, among the four time of planting, August planting was the best as far as the fruit weight with crown as well as without crown is concerned. For applying the growth regulator (ethephon) for inducing flowering, proper physiological maturity of the plant should be attained. Otherwise the fruit size will be reduced considerably. The growth regulator application at six months after planting in all the four times of planting, produced significantly lower sized fruits which can be corre-

lated with the lower number of leaves in this treatment at the time of growth regulator application. Several workers have reported positive correlation between fruit size and leaf number in the case of pineapple (Dutta, 1966; Chadha *et al.*, 1977). Eight months after planting was found to be the best time for growth regulator application. However, it may be possible to improve the fruit size in plants having lower leaf number by better management practices.

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