INFLUENCE OF SIZE OF SUCKER AND METHOD OF PLANTING ON THE GROWTH AND YIELD OF PINEAPPLE VAR. 'MAURITIUS'

By

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THESIS

Submitted in partial fulfilment of the requirement for the degree of

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DECLARATION

I hereby declare that the thesis entitled **'Influence of size of sucker and method of planting on the growth and yield of pineapple var. Mauritius'** is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other University or Society.

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CERTIFICATE

Certified that the thesis entitled **'Influence of size of sucker and method of planting on the growth and yield of pineapple var. Mauritius'** is a record of research work done independently by **Miss.V.Bindu,** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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Introduction

INTRODUCTION

Pineapple (*Ananas comosus* [L.] Merr.), belonging to family Bromeliaceae, is one of the choicest fruits of the world owing to its characteristic pleasant flavour, aroma, sweet juice and seedlessness. The unique fruit qualities and high productivity under marginal conditions make pineapple a commercially important fruit crop. In India, pineapple is mainly grown in the states of Assam, Kerala, West Bengal, Tripura, Meghalaya, Bihar and Karnataka.

In Kerala, pineapple occupies an area of 6180 ha (FIB, 1997). The two important varieties of pineapple under cultivation in Kerala, are Kew and Mauritius. Of late, the variety Mauritius has gained more importance than Kew, occupying about 60 per cent of the total pineapple acreage in the state. The suitable climate, better marketing prospects both as fresh fruit and processed product, better keeping quality and less damage in distant transport, have elevated this variety to the status of a commercial variety of Kerala.

Though phenomenal increase in area and production of Mauritius pineapple has occurred during the last two to three years, practically very little research work has been done to standardise suitable agro-techniques for this variety. The package of practices recommendations of the Kerala Agricultural University which are based on the performance of Kew variety, may be unsuitable for Mauritius variety, as the growth and duration of Mauritius are entirely different from that of Kew. Hence it is essential to develop cultivation practices suitable for the Mauritius variety.

Among the agro-techniques, type of planting material used, plays a pivotal role in regulating the growth and yield. Different planting materials like slips, suckers, crowns and stumps are used of which suckers are the most preferred

planting material in Kerala (Chadha and Singh, 1993). In variety Mauritius, suckers of different sizes are used by farmers of Kerala in commercial cultivation, which leads to difficulty in management, uneven growth, flowering and harvesting. This reduces the labour efficiency and increases the cost of production. Thus, a knowledge of the size of sucker to be used as planting material, in order to obtain optimum and uniform yield per hectare, is absolutely essential.

Pineapple is cultivated on level ground, flat beds, ridges or in deep trenches (Balakrishnan *et al.*, 1977). Planting in trenches ensures moisture conservation, but the labour involved is more. In Kerala, where the labour charges are very high, planting in trenches add to the cost of production. The method of planting should be selected so as to bring down the cultivation cost to the extent possible, while ensuring optimum yield and profitability.

Hence, the proposed study was aimed at standardising the optimum size of sucker and suitable method of planting for pineapple variety Mauritius.

Review of Literature

REVIEW OF LITERATURE

A brief review of the research work pertaining to the influence of size of planting material and method of planting in pineapple is highlighted in this chapter.

The review is classified according to the treatments under study and their influence on various growth parameters.

2.1 Influence of size and type of planting material

The choice of the planting material mainly depends on the performance of the plants developing from them. Crowns, slips, suckers, hapas and stumps are used as planting material in pineapple (Collins, 1949). These planting materials differ in their survival, establishment, growth rate, duration, yield and fruit quality. The ease in handling and cost of transportation, also count to a certain extent. Smaller the planting material, lesser is the transportation cost but handling and planting of too small material proves difficult. Hence, it is important to determine the optimum size and type of planting material for obtaining maximum yield of quality fruit (Chadha *et al.*, 1974a).

2.1.1 Vegetative characters

Py (1960) reported that suckers weighing 400 to 500 g produced plants with more leaves than those weighing 200 to 300 g. This finding was supported by Mitchell (1962). In his studies on Smooth Cayenne pineapple conducted at Queensland, he observed that heavier planting material resulted in larger plants at the time of forcing. The 'D' leaf weight was directly influenced by the size of planting material. The number of slips was found to be increased by the use of

larger planting material whereas the number of suckers appeared to be unaffected by the size of planting material.

Teaotia and Pandey (1962) proposed different planting materials viz., slip, crown, sucker and green stump for Giant Kew variety of pineapple and parent stump, sucker and crown for Queen variety.

Teaotia and Pandey (1966) reported that in variety Giant Kew, crowns showed a better percentage of survival (83.75%) than suckers (75%) and slips (71.25%), whereas slips were more vigorous in growth than suckers. Plants raised from slips produced more leaves than those raised from crowns and suckers. In Taiwan, heavier slips were found to produce greater plant growth (Wang and Kwang, 1967).

Plants of variety Singapore Spanish, grown from large slips were significantly taller by 10.6 cm and 30.6 cm, in the third and ninth month respectively, than those from small slips and their increment in growth was also significantly greater. Also, large slips produced plants with more leaves than smaller slips, the differences being 9.5 leaves at three months and 16.4 leaves at nine months (Tan and Wee, 1973).

Chadha *et al.* (1974a) in a study conducted at Hessaraghatta, in variety Kew, observed that the highest establishment of 80 per cent was found in the largest grade of suckers (> 1250 g). Larger slips were however inferior to smaller slips in establishment. Both in slips and suckers, larger the material, more was the leaf number. Larger material, both in suckers and slips, resulted in more sucker number and the smaller material in all the types resulted in the minimum number.

In a study conducted at Basti using Giant Kew pineapple, Singh and Singh (1975) found that there was a gradual decline in survival percentage with the increase in size of suckers. However, the large size of suckers significantly increased the length, breadth and number of leaves.

Norman (1976) reported that plants from large slips continued to grow faster than those from smaller slips. However, by the time of flower induction i.e., 11½ months after planting, no significant difference in plant height could be observed. Larger slips produced a greater number of leaves than medium and small slips. No significant difference was observed between treatments, regarding sucker production.

According to Gadelha and Vasconcellos (1977) in cv. Perola the tallest plants and maximum number of leaves were observed in plants raised from slips of 50-55 cm length and weighing 185-200 g, than from smaller slips.

Treto and Guzman (1979) found that larger slips of cv. Smooth Cayenne recovered more rapidly than smaller ones when adverse weather conditions occurred.

Suckers having more number of leaves showed better leaf production (Balakrishnan *et al.*, 1981).

According to Varkey *et al.* (1984) heavier suckers (751-1000 g) produced more number of leaves at the sixth (29.11), 12^{th} (39.3) and 18^{th} (50.52) months, compared to lighter suckers (14.48, 23.42 and 34.6 leaves respectively). The difference in leaf production between treatments narrowed, as the plant advanced in growth except in suckers weighing 250 g.

Ahmed and Mohan (1985) reported that the size of 'D' leaf proportionately increased with increase in size of planting material. Jordan-Molero (1986) also observed that vegetative development was directly proportional to slip size.

Heenkenda (1993) found that in Mauritius variety, plants with more than 31 mature leaves produced highest sucker yield (4.3 suckers per plant). Choairy *et al.* (1994) reported that the number of suckers produced was greatest, when larger planting material was used in Smooth Cayenne pineapple.

2.1.2 Flowering characters

As early as in 1934, Linford *et al.* in Hawaii observed that the planting of large slips enables earlier induction of flowering and hence, earlier fruiting, than plants from small slips.

According to Mitchell (1962) flowering and harvesting tended to be slightly advanced by using larger planting material.

Studies conducted by Teaotia and Pandey (1966) in var. Giant Kew showed that suckers produced maximum total flowering, compared to crowns, slips and stumps.

Chadha *et al.* (1974a) reported that the crowns, the smallest slips and suckers and the largest slips and suckers showed poor flowering, while the medium weight slips or suckers showed good flowering. However, the largest grade suckers (> 1250 g) flowered earliest (435.8 days) than all other grades of suckers, slips and crowns, while the smallest grade suckers or slips flowered last of all (483.3 days). The most staggered flowering was noticed in the largest grade of suckers, the

flowering being spread over 72.5 days while the most uniform flowering was noticed in medium grade suckers, the spread being over only 32.2 days.

Every additional gram weight in the slip size, had a stronger effect on early blossoming (Pennock and Gandia, 1975). This finding was supported by Singh and Singh (1975). They observed that the increase in percentage of flowering was directly related to the increase in sucker size. The smallest grade suckers (100 g) showed the lowest flowering percentage (47.0) while the largest grade suckers (900 g) showed the highest flowering percentage (85.8).

In Sugarloaf pineapple at the time of induction of flowering, ie. 11½ months after planting, 46.7 per cent of plants from large slips and 17.1 per cent of plants from medium slips had flowered, while the plants from small slips were still vegetative. Thus, smaller slips delayed flowering (Norman, 1976).

Balakrishnan *et al.* (1981) reported that irrespective of the size of suckers used for planting, all the plants were ready for artificial induction of flowering in the 18th month of planting.

Studies conducted by Varkey *et al.* (1984), in Kew pineapple revealed that suckers of the lowest weight group (250 g) recorded the maximum period of 32 months for 50 per cent flowering, while it was only 21 months for suckers weighing 501-750 g. Highest percentage of flowering (52.41%) at the 19^{th} month was in plants raised from heaviest suckers (751-1000 g) followed by suckers weighing 501-750 g and these were on par.

According to Ahmed and Mohan (1985), in Kew variety the lowest percentage of flowering (71.66) was recorded in the smallest grade of suckers (< 250 g).

Gonzalez-Tejera (1986) reported that plants from slips weighing 350-490 g showed a greater response to flowering induction treatment 12 months after planting than plants from smaller slips.

2.1.3 Fruit and yield characters

Py (1953) reported that approximately 35 functional leaves were needed to produce a fruit of 1.5 kg in pineapple variety Baronne de Rothschild and a variation of 10 leaves resulted in a difference of 0.5 kg in fruit weight.

According to Collins (1960), different planting materials have the virtue of spreading the harvest season, as suckers bear fruit in about 17 months, slips in 20 months, crowns in 22 to 24 months and stumps in 35 to 40 months.

Py (1960) in Guinea, reported that plants with heavier fruits were produced from suckers weighing 400 to 500 g than those weighing 200 to 300 g.

Mitchell (1962) reported that in Smooth Cayenne pineapples, the use of smaller planting materials tended to delay harvesting slightly. An increase in the size of planting material from 6 oz to 9 oz was found to increase the average fruit weight by 7 per cent. This increase was equivalent to 1.5 tonnes per acre. Senewiratne (1964) reported early fruiting with largest suckers. Wang and Kwang (1967) observed that heavier slips led to higher yields and fruit weights.

According to Reynhardt and Dalldorf (1968a), medium and large suckers of Cayenne pineapples fruited earlier than other types of planting material, but small suckers took longest time to bear. In Queen pineapple, highest yields were got from suckers 18" long and having 8 oz weight (Reynhardt and Dalldorf, 1968b).

Gaillard (1969) found that the weight of the slip at planting had significant influence on the productivity of the pineapple plant.

Studies conducted using slips of cv. Pernambuco Masca Amarela showed that the highest number of fruits per plot and the best average weights (0.96 to 1.21 kg) were obtained with slips of 35 to 45 cm length. The use of smaller slips reduced the fruit number and the average weights (Fortes *et al.*, 1971).

Tan and Wee (1973) conducted studies in cv. Singapore Spanish and observed that the mean fruit weight of plants from large slips was 0.46 kg or approximately 41 per cent more than that from small slips. Plants from larger slips also produced fruits with a significantly higher acid content than those from small slips.

Chadha *et al.* (1974a) studied the effect of type and size of planting material on the yield and quality in Kew pineapple. They observed that the number of days taken from flowering to fruit maturity was the lowest in the case of small slips weighing less than 150 g (154.60 days) while it was highest in the case of large suckers weighing 1001-1250 g (170.98 days). However, the crop duration was lesser in plants raised from medium sized suckers (751-1000 g) than in plants raised from smallest suckers (< 500 g); the duration being 604.33 days and 640.53 days respectively. In general, larger material gave harvestable fruits earlier than smaller ones. Regarding fruit size, largest sucker size (> 1250 g) resulted in largest fruits of 1.818 kg and 1.650 kg with and without crown respectively, while it was 1.485 kg and 1.292 kg in the case of smallest suckers (< 500 g). Fruits from medium sized slips (301-450 g) gave best sugar:acid ratio (16.85) while those from large suckers (1001-1250 g) gave least sugar:acid ratio (11.02).

In another study, Chadha *et al.* (1974b) reported that smaller material resulted in smaller fruits and larger material in larger fruits. The shape of the fruits obtained from all the types and sizes of planting material were more or less the same.

The effect of sucker size on the growth, yield and quality of Giant Kew pineapple was studied by Singh and Singh (1975). It was observed that the fruits obtained from the smallest grade suckers (100 g) matured earliest (160.2 days) while those from largest grade suckers (900 g) took maximum time to mature (168 days). However, the maximum fruit weight, length, circumference and number of eyes were obtained from largest grade suckers and declined with decrease in sucker size. The yield increased gradually with increase in the size of suckers, the highest being for 900 g suckers (21.369 t/ha) and the lowest being for 100 g suckers (11.982 t/ha).

According to Bourke (1976) in Papua New Guinea, aerial ground suckers came into bearing earlier than other types of planting materials and were the best yielders in terms of fruit number and weight.

Norman (1976) observed that smaller slips delayed fruit maturity, reduced the fruit size and yield in Sugarloaf pineapple. Large slips produced longer fruits with more basal girth. However, the slip size did not influence either the TSS or the acid content of the fruit.

Tay and Wee (1976) reported that bigger sized planting materials consistently resulted in higher yield. The mean fruit length and fruit weight also increased with increase in size of planting materials, while no significant difference was observed in the mean fruit diameter. The fruit quality was also unaffected by the treatments.

Wurster and Moe (1976) observed that in Uganda, the early yields of fruit produced from slips and suckers were greater than the yield of fruit produced from crowns but there were no significant differences between the planting materials in the total yield of fruit produced.

Gadelha and Vasconcellos (1977) found that in cv. Perola, the largest slips 50-55 cm long and weighing 185-200 g produced the best quality fruits.

According to Balakrishnan *et al.* (1981), the size of sucker had no significant influence on fruit weight.

Varkey *et al.* (1984) observed that the fruit characters viz., fruit weight with crown and without crown did not differ significantly when suckers of weight ranging from 250 g to 1000 g were used.

Ahmed and Mohan (1985) reported that in variety Kew larger suckers and slips produced fruits early. The fruit weight and size (length and circumference) were not significantly affected by the type and size of the planting materials. However, the highest yield of 76.23 t/ha was obtained from suckers weighing 501 to 750 g while it was only 53.87 t/ha in suckers weighing less than 250 g. The quality in terms of TSS and acidity was not affected by the size and type of planting materials.

Gonzalez-Tejera (1986) reported that yields were the highest (105.8 t/ha) in plants from the largest slips weighing 490 g, while fruit quality was not affected by the size of slips.

According to Reinhardt *et al.* (1987) large suckers of cv. Smooth Cayenne produced higher yields than small suckers, but differences were not significant.

Nazim Uddin and Amzad Hossain (1988) observed that the total yield was highest in plants propagated from crowns, followed by those from stem suckers and slips.

Suckers weighing 500 to 600 g and slips weighing 350 to 400 g were observed to be the best under high density planting in Kew variety (Chadha and Singh, 1993).

Studies conducted in cv. Smooth Cayenne showed that the growth cycle was longer with suckers of 300 g than with larger suckers weighing 500 g or 700 g (Choairy *et al.*, 1994).

2.2 Influence of method of planting

The methods of cultivation of pineapple vary in different parts of the country.

Dhareshwar (1950) recommended planting pineapple on ridges, especially as an intercrop.

According to Hayes (1957) in Hawaii pineapple suckers were planted in individual holes by means of a planting iron with or without the use of polyethene paper. Aiyappa and Nanjappa (1965) reported that trench planting was better under South Indian conditions.

In a study conducted by Balakrishnan *et al.* (1977) at Kannara, Kerala, it was observed that there was no significant difference in the total weight of fruits per plot, when suckers were planted at ground level or in trenches of 15, 30, 45 and 60 cm depth.

Mohan and Ahmed (1984) reported that plant growth and fruit quality were not appreciably affected by the different depths of trenches, but fruit yield was the highest (54.32 t/ha) with a 21.5 cm trench depth, and the lowest (44.87 t/ha) with a 30 cm trench depth.

Radha *et al.* (1990) observed that the different depths of trench treatments showed significant influence on some of the vegetative parameters such as 'D' leaf length and 'D' leaf area at six months after planting and 'D' leaf breadth at one year after planting, indicating that deeper trenches influence the vegetative growth to a certain extent. Fruit length and yield of fruits per hectare were more under deeper trench treatment for the plant crop. However, the depth of trenches did not influence the fruit and yield characters of the first ratoon crop.

Uthaiah *et al.* (1990) reported that in cv. Kew the highest yield of 68.6 t/ha was produced from 45 cm deep trenches, whereas 15 cm deep trenches gave the lowest yield of 36.4 t/ha.

Chadha and Singh (1993) observed that trials conducted in different agroclimatic regions have revealed the superiority of trench planting for three crop cycles, while for one crop cycle flat planting was found equally good. In hilly terrain of north-eastern region, trenches were made across the slope and planting was done in trenches which helped to conserve soil as well as to maintain the crop for a longer time. Contrary to this, in North Bengal, planting on flat land was preferred to avoid over-moisturing in the plantation.

Material and Methods

MATERIALS AND METHODS

The present investigations carried out with a view to study the influence of size of sucker and method of planting on growth and yield of pineapple variety Mauritius, were conducted in the Department of Pomology and Floriculture, College of Horticulture and the Kerala Horticulture Development Programme, Vellanikkara, Thrissur, during the year 1994-96.

The location is situated at an altitude of 22.25 m above MSL at 10°32' N latitude and 76°16' E longitude. The area receives warm humid tropical climate. The soil type is laterite. The meteorological data are presented in Appendix I.

The materials used and the methods adopted are discussed in this chapter.

3.1 Variety and planting material

Suckers of pineapple variety Mauritius, procured from Vazhakkulam, Muvattupuzha, the major pineapple growing tract of Kerala, were used for the study. Healthy suckers of three sizes, viz., 500 g, 750 g and 1000 g were collected (Plate 1).

3.2 Design of the experiment

The experimental design was Randomised Block Design with 9 treatments and 3 replications. The layout plan of the experiment is given in Fig.1.

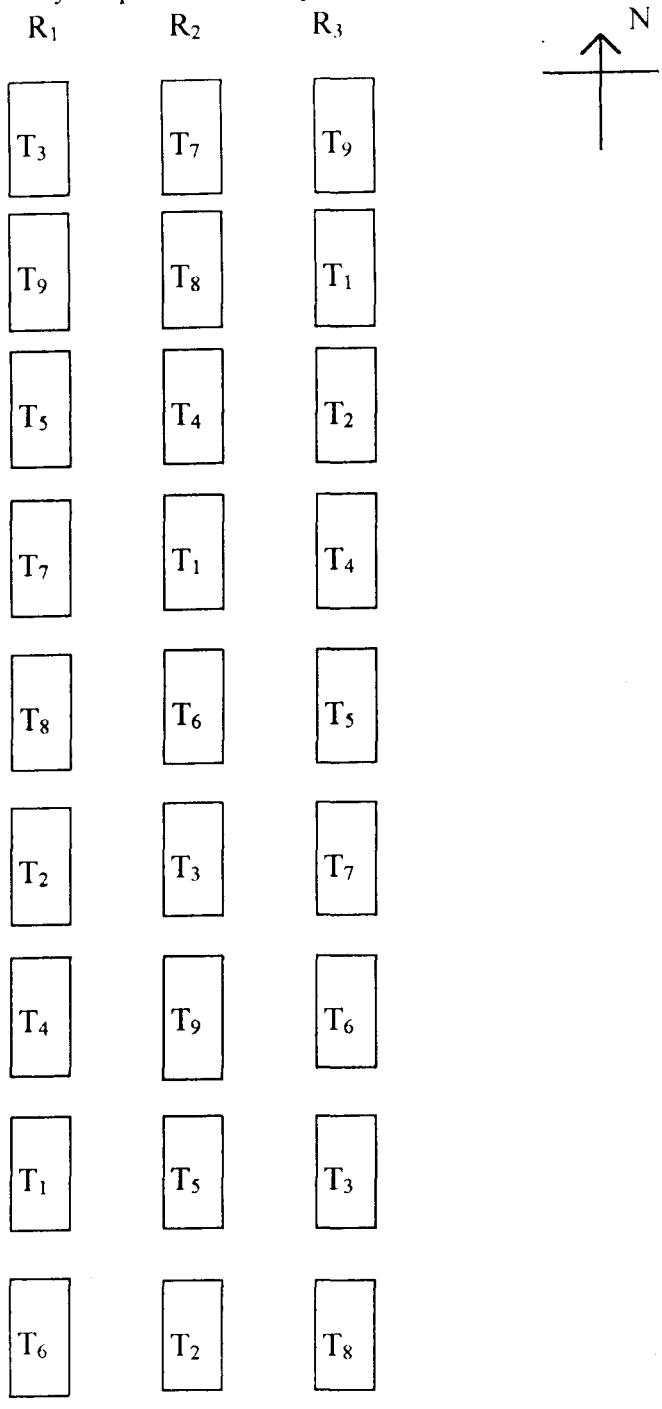
3.3 Treatments

The treatment details are as given below:

Plate 1. Size of suckers used for planting


500 g
750 g
1000 g

Fig.1 Layout plan of the experiment



R_1 = Replication 1, R_2 = Replication 2, R_3 = Replication 3

T_1 - 500 g sucker + ground level, T_2 - 750 g sucker + ground level,
T_3 - 1000 g sucker + ground level, T_4 - 500 g sucker + 15cm trench depth
T_5 - 750 g sucker + 15cm trench depth, T_6 - 1000 g sucker + 15cm trench depth
T_7 - 500 g sucker + 30cm trench depth, T_8 - 750 g sucker + 30cm trench depth
T_9 - 1000 g sucker + 30cm trench depth

T_1 - 500 g suckers + planting at ground level

T_2 - 750 g suckers + planting at ground level

T_3 - 1000 g suckers + planting at ground level

T_4 - 500 g suckers + planting in trenches of 15 cm depth

T_5 - 750 g suckers + planting in trenches of 15 cm depth

T_6 - 1000 g suckers + planting in trenches of 15 cm depth

T_7 - 500 g suckers + planting in trenches of 30 cm depth

T_8 - 750 g suckers + planting in trenches of 30 cm depth

T_9 - 1000 g suckers + planting in trenches of 30 cm depth

Suckers weighing 500 g had a mean height of 56.3 cm, while those weighing 750 g and 1000 g had a mean height of 62.8 cm and 70.5 cm respectively. The mean number of leaves was 15.9 for 500 g suckers, 20.8 for 750 g suckers and 25.7 for 1000 g suckers. The length of 'D' leaf was 40.8 cm, 43.5 cm and 45.4 cm for 500 g, 750 g and 1000 g suckers respectively.

3.4 Layout and planting

Planting was done in June 1995, at the Kerala Horticulture Development Programme (KHDP), Kerala Agricultural University Main Campus, Vellanikkara, on level ground, in 15 cm deep trenches and in 30 cm deep trenches.

The trial was conducted with nine treatments and three replications. Each treatment consisted of 120 plants, with 40 plants in each replication. The 40 plants were planted in 2 trenches having 2 rows each, with 10 plants in each row.

The land was cleared, ploughed and levelled. Trenches of length 300 cm and width 90 cm were prepared, aligned at a distance of 165 cm from centre to centre.

Cowdung at the rate of 25 t/ha was applied as basal dressing. The suckers were planted in the trenches in 2 rows at a depth of 7.5-10.0 cm, at a spacing of 30 cm between plants and 70 cm between the rows.

3.5 Cultural and management practices

The cultural and management operations were done according to the package of practices recommendations of the Kerala Agricultural University.

Fertilizers at the rate of 8:4:8 g N, P and K per plant were applied in the form of urea, mussoriephos and muriate of potash(KAU, 1993). The application was done in three split doses.

Protective irrigation was given as and when required. Weeding was done at regular intervals.

To induce uniform flowering, ethrel (Ethephon) was applied to the plant at 39-42 leaf stage, as per the package of practices recommendations of the Kerala Agricultural University. A combination treatment of 25 ppm ethrel, two per cent urea and 0.04 per cent calcium carbonate was used. The solution was applied at the rate of 50 millilitres per plant, by pouring into the heart of the plant.

3.6 Observations

In each plot, sixteen plants from the centre were selected as observation plants and the following observations were recorded.

3.6.1 Vegetative characters

3.6.1.1 Number of leaves at planting

The total number of fully formed leaves at the time of planting was recorded.

3.6.1.2 Length of 'D' leaf at planting

The length of 'D' leaf (5th leaf from the top) was recorded and expressed in centimeters.

3.6.1.3 Percentage of establishment

The percentage of establishment of the plants was recorded 15 days after planting.

3.6.1.4 Plant height

The height of the plant from the ground level to the tip of the longest leaf was measured at monthly intervals and also at the time of application of ethrel and expressed in centimeters.

3.6.1.5 Number of leaves per plant

The total number of leaves was recorded at monthly intervals and at the time of ethrel application.

3.6.1.6 Length and breadth of 'D' leaf

The 'D' leaf was taken out and the length and breadth were recorded at quarterly intervals and expressed in centimeters.

3.6.1.7 'D' leaf area

The 'D' leaf area was worked out using the formula suggested by Balakrishnan *et al.* (1978).

$$LA = L \times B \times 0.725$$

where LA = leaf area in cm^2

L = length of 'D' leaf in cm

B = breadth of 'D' leaf in cm

and 0.725 is the constant.

3.6.1.8 Leaf area index (LAI)

Leaf area index was worked out from the formula suggested by Watson (1952).

$$LAI = \frac{\text{Total leaf area per plant } (cm^2)}{\text{Total land area occupied per plant } (cm^2)}$$

3.6.1.9 Leaf production rate

The mean number of leaves produced per month upto flowering was recorded.

3.6.1.10 Root:shoot ratio

Root:shoot ratio is the ratio of the average dry weight of the root to the average dry weight of the shoot.

3.6.1.11 Total dry matter production

The whole plant was uprooted, washed free of dirt, and separated into root, stump and leaves. This was dried in a hot air oven at 80°C till constant weight was attained. The total dry matter production in each treatment was expressed in tonnes per hectare.

3.6.1.12 Harvest index

Harvest index was calculated using the formula of Donald (1962).

$$HI = \frac{\text{Economic yield}}{\text{Total biological yield}} \times 100$$

3.6.1.13 Number of suckers per plant

The mean number of suckers produced per plant was recorded after harvest of the crop.

3.6.1.14 Position of suckers

Suckers are found in three positions with respect to the mother plant, viz., low (within 5 cm from the ground level), medium (between 5-15 cm from the ground level) and high (more than 15 cm from the ground level). The number of suckers per plant in each position was recorded and expressed as percentage.

3.6.2 Flowering characters

3.6.2.1 Days to attain physiological maturity

The time taken from planting to attain 39-42 leaf stage in each treatment was recorded.

3.6.2.2 Days for initiation of flowering (visual)

The mean number of days taken from ethrel application to the appearance of reddish colour at the centre of the plant was recorded.

3.6.2.3 Days for 50 per cent flowering

The mean number of days taken from ethrel application to emergence of inflorescence in 50 per cent of the plants in each treatment was recorded.

3.6.2.4 Flowering phase

The number of days from the opening of the first flower to the opening of the last flower in an inflorescence was recorded.

3.6.3 Fruit and yield characters

The fruits were harvested when they attained physiological maturity (appearance of yellow colour at the bottom one-third of the fruit). The following observations were recorded immediately after harvest.

3.6.3.1 Fruit weight

The weight of fruits, with crown intact and without crown, was recorded immediately after harvest and expressed in kilograms.

3.6.3.2 Length of the fruit

The length of the fruit was recorded and expressed in centimeters.

3.6.3.3 Girth of the fruit

The girth of the fruit in the middle portion was recorded and expressed in centimeters.

3.6.3.4 Breadth of the fruit

The breadth of the fruit at three portions, namely top three-fourth, middle and bottom one-fourth were recorded and expressed in centimeters. The mean fruit breadth was calculated.

3.6.3.5 L/B ratio

L/B ratio was worked out using the formula suggested by Pantastico (1975).

$$\text{L/B ratio} = \frac{\text{Fruit length (cm)}}{\text{Mean fruit breadth (cm)}}$$

3.6.3.6 Taper ratio

The taper ratio of the fruit was arrived at using the formula

$$\text{Taper ratio} = \frac{\text{Breadth at top 3/4}}{\text{Breadth at bottom 1/4}}$$

3.6.3.7 Yield per hectare

The mean fruit yield per hectare was worked out from the fruit weight and expressed in tonnes per hectare.

3.6.3.8 Days for fruit maturity

The mean number of days taken from emergence of inflorescence to harvest was worked out for each treatment.

3.6.3.9 Crop duration

The mean number of days taken from planting to harvest was worked out.

3.6.4 Qualitative analysis of fruits

Immediately after harvest, the fruits were subjected to qualitative analysis.

Ten fruits were selected from each treatment for analysis. Samples were taken from each fruit from the top, middle and bottom portions and these samples were then pooled and macerated well in a waring blender. The samples from this were used for analysis.

3.6.4.1 Juice content

A known weight of the fruit pulp was squeezed in a muslin cloth to extract the juice and the juice content was calculated using the formula

$$\text{Juice content} = \frac{\text{Weight of juice}}{\text{Weight of fruit pulp}} \times 100$$

The juice content was expressed as percentage.

3.6.4.2 Total soluble solids (TSS)

Total soluble solids were found out using a pocket refractometer and expressed as degree brix.

3.6.4.3 Titrable acidity

Ten grams of macerated fruit sample was mixed with distilled water and made upto a known volume. An aliquot of the filtered solution was titrated against 0.1N sodium hydroxide using phenolphthalein as indicator. The acidity was expressed as percentage of citric acid (AOAC, 1960).

3.6.4.4 Total sugars

The total sugars were determined as per the method described by AOAC (1960).

To a known volume of the clarified solution, 10 millilitres of concentrated hydrochloric acid was added and the same was kept overnight. The solution was then neutralised using 1N sodium hydroxide and titrated against a mixture of Fehlings solution A and B, using methylene blue as indicator.

The total sugar content was worked out from the titre value and expressed as percentage.

3.6.4.5 Reducing sugars

The reducing sugars in the sample were estimated as per the procedure described by AOAC (1960).

A known quantity of the macerated pulp was made up to a known volume using distilled water. The solution was filtered and an aliquot of this was titrated against a mixture of Fehlings solution A and B, using methylene blue as indicator. The content of reducing sugar was expressed as percentage.

3.6.4.6 Non-reducing sugars

Non-reducing sugars were obtained by subtracting the amount of reducing sugars from the total sugars.

3.6.4.7 Ascorbic acid

A known weight of the fruit sample was macerated and made up to a known volume using four per cent oxalic acid and filtered. The aliquot was titrated against a standard solution of 2,6,Dichlorophenol indophenol dye.

The ascorbic acid content was expressed as mg/100 g of the fruit (AOAC, 1960).

3.7 Statistical analysis

The observations taken on various characters were tabulated and the data were subjected to statistical analysis using the method suggested by Panse and Sukhatme (1985).

Results

RESULTS

Results of the experiment carried out to assess the influence of size of sucker and method of planting on the growth and yield of pineapple variety Mauritius are presented in this chapter.

4.1 Plant characters

Plant characters namely, the vegetative characters as influenced by the various size of suckers and methods of planting are presented hereunder.

4.1.1 Percentage of establishment

In all the treatments, the suckers showed hundred per cent establishment after 15 days of planting.

4.1.2 Plant height

Data pertaining to the mean plant height at monthly intervals are presented in Table 1.

At one month after planting, suckers weighing 1000 g when planted in 30 cm deep trenches (T_9), produced the maximum height of 77.5 cm which was significantly superior to all other treatments (Fig.2a). The next best results were obtained from suckers of 1000 g, planted in 15 cm trenches (T_6) which was on par with suckers weighing 1000 g planted at ground level (T_3). Planting at ground level with 500 g suckers (T_1) produced the minimum height of 58.6 cm, which was on par with 500 g suckers planted 15 cm deep and 30 cm deep trenches (T_4 and T_7 respectively).

Table 1 . Effect of treatments on plant height of pineapple var. Mauritius

Treatments	Plant height (cm)					
	1 MAP*	2 MAP*	3 MAP*	4 MAP*	5 MAP*	At ethrel application
T_1	58.6	63.2	66.6	76.9	88.0	92.8
T_2	67.3	70.4	72.9	77.9	84.5	90.4
T_3	71.7	75.0	77.1	82.6	89.2	91.6
T_4	60.6	63.7	66.3	77.8	87.6	89.3
T_5	63.7	66.8	69.5	72.3	76.5	85.2
T_6	73.8	76.1	77.8	84.7	93.2	96.0
T_7	59.6	63.4	68.8	76.7	86.5	87.0
T_8	68.3	70.6	73.3	80.2	91.3	96.1
T_9	77.5	79.5	84.7	89.6	97.6	103.5
SEm±	1.094	1.250	1.609	3.326	3.080	3.447
CD(0.05)	3.280	3.747	4.825	9.972	9.235	10.330

* MAP - Months after planting

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

Two months after planting, T_9 recorded a maximum height of 79.5 cm, which was on par with T_6. The lowest value was obtained for T_1 which was on par with planting 500 g suckers and 750 g suckers in 15 cm deep trenches (T_4 and T_5 respectively) and also with T_7 (Fig.2a).

The superiority of T_9 with respect to plant height continued three months after planting also. Treatment T_9 produced the maximum plant height of 84.7 cm followed by T_6. The minimum height (66.3 cm) was recorded by T_4. The highest value obtained for T_9 was 27 per cent more than the value obtained for T_4 (Fig.2b).

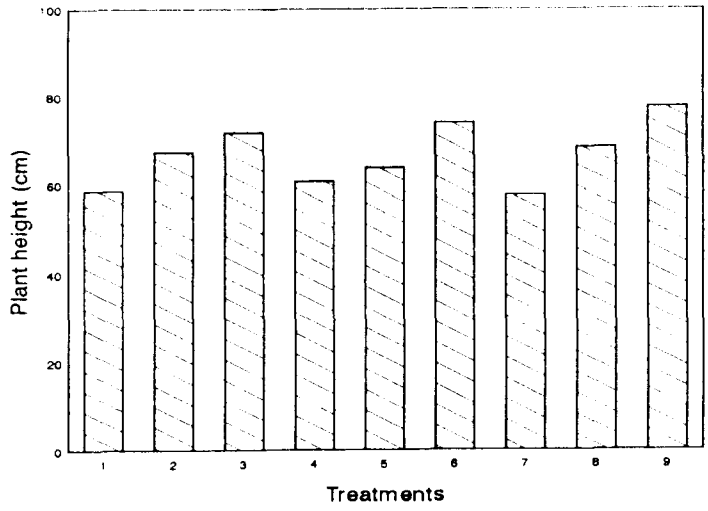
Four months after planting, T_9 showed significant superiority (89.6 cm) and it was on par with T_3, T_6 and T_8 (planting 750 g suckers at 30 cm depth). The treatment T_6 produced a height of 84.7 cm and it was on par with T_1, T_2, T_3, T_4, T_7 and T_8 (Fig.2b). The treatment T_5 resulted in the lowest value (72.3 cm).

At five months after planting, even though T_9 recorded maximum height (97.6 cm), it was on par with T_1, T_3, T_4, T_6 and T_8. The treatment T_5 recorded the lowest value (76.5 cm), which was on par with T_2 (Fig.2c).

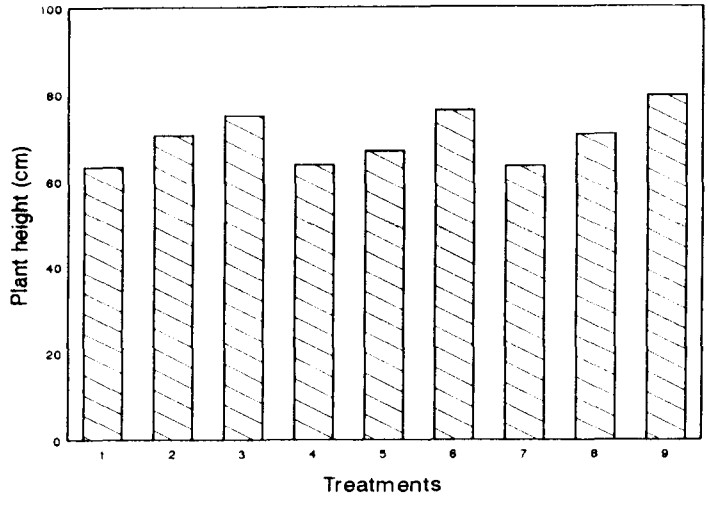
At the time of application of growth regulator ethrel (applied 5½ months after planting for treatments T_3, T_6 and T_9 and 6½ months after planting for treatments T_1, T_2, T_4, T_5, T_7 and T_8), treatment T_9 recorded the maximum height of 103.5 cm. The treatment T_5 recorded the minimum height of 85.2 cm (Fig.2c)

4.1.3 Number of leaves per plant

Data on the mean number of leaves per plant, as influenced by different size of suckers and method of planting are given in Table 2.

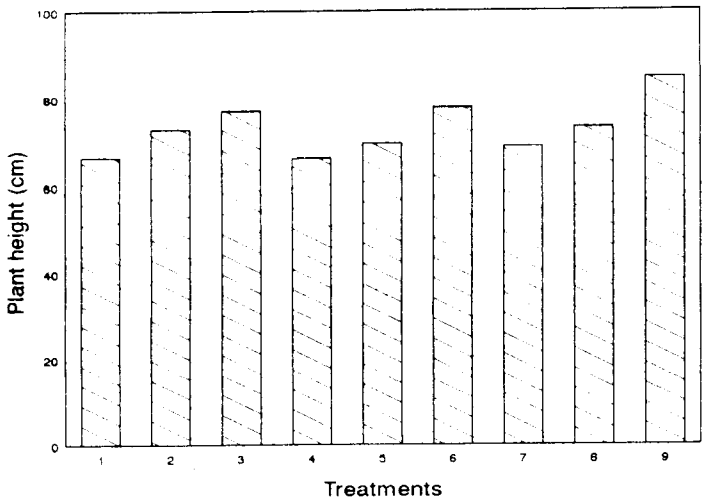


One month after planting

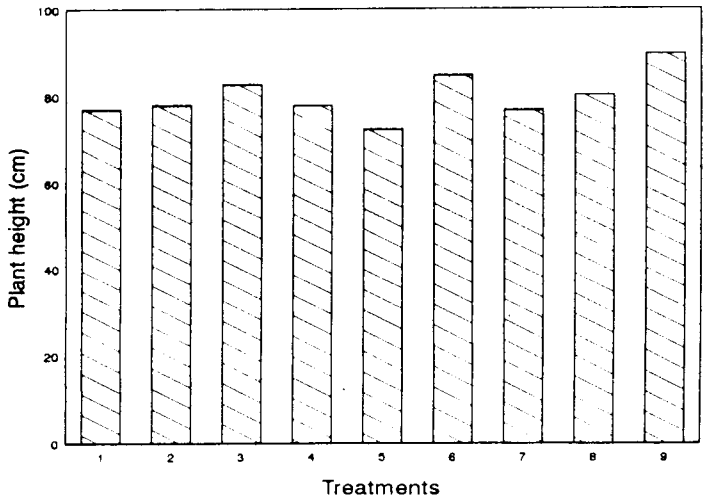


Two months after planting

Fig.2a. Effect of treatments on plant height

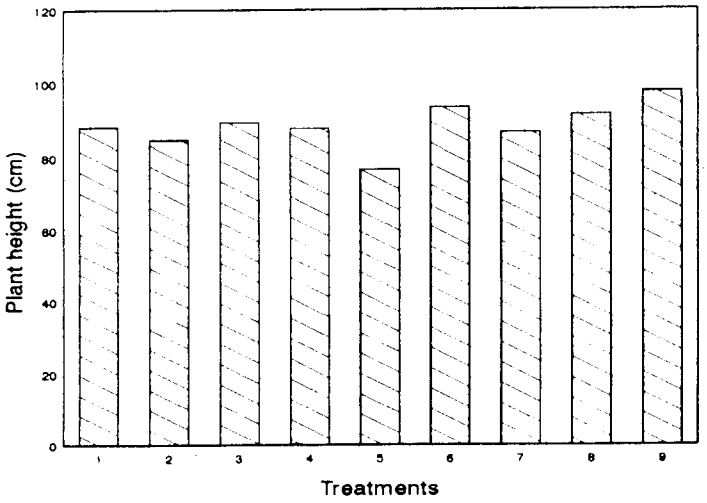


Three months after planting

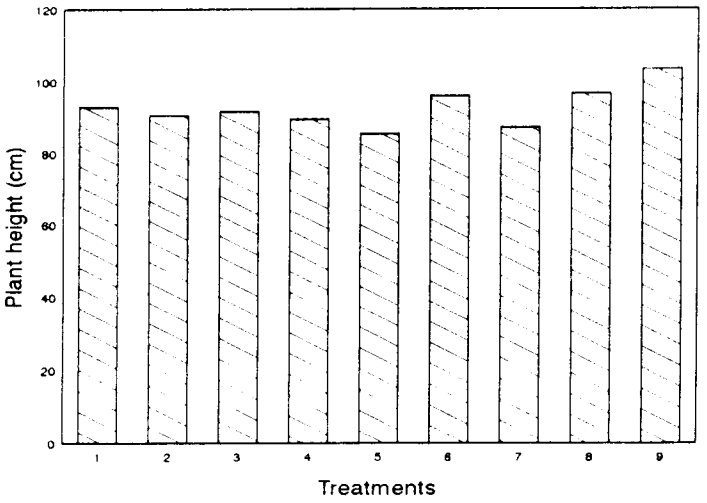


Four months after planting

Fig.2b. Effect of treatments on plant height



Five months after planting



At ethrel application

Fig.2c. Effect of treatments on plant height

Table 2 . Effect of treatments on number of leaves of pineapple var. Mauritius

Treatments	Number of leaves					
	1 MAP*	2 MAP*	3 MAP*	4 MAP*	5 MAP*	At ethrel application
T_1	18.2	24.2	28.3	29.9	36.6	40.0
T_2	23.3	28.6	30.0	33.0	36.9	42.1
T_3	27.0	31.1	34.1	37.2	39.3	40.9
T_4	19.7	24.1	28.0	30.4	34.6	39.1
T_5	23.9	25.7	28.7	31.3	35.0	38.7
T_6	27.3	31.1	33.9	37.1	40.0	41.6
T_7	18.5	22.6	25.7	27.8	32.7	37.8
T_8	23.2	26.7	29.1	31.1	36.2	39.2
T_9	29.3	31.5	34.6	36.1	38.3	39.8
SEm±	0.868	0.636	0.538	0.888	1.016	0.876
CD(0.05)	2.603	1.907	1.613	2.662	3.045	NS

* MAP - Months after planting; NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

The data indicated that at one month after planting, the maximum number of leaves (29.3) was produced by T_9, which was on par with T_3 and T_6. These three treatments were significantly superior to all other treatments. Treatments T_2, T_5 and T_8 were the second best set of treatments and were on par. The treatments T_1, T_4 and T_7 produced the lower number of leaves and were on par.

At two months after planting also, T_9 produced the maximum number of leaves (31.5) and was on par with T_3 and T_6. Treatments T_2 and T_8 were on par. Treatment T_7 resulted in the lowest value (22.6) while being on par with T_1 and T_4.

The superiority of T_9 with respect to number of leaves continued three months after planting also, and it was on par with T_3 and T_6. Treatment T_7 produced the lowest value (25.7) which was significantly inferior to the rest of the treatments.

However, four months after planting, T_3 showed maximum leaf number (37.2) which was on par with T_6 and T_9, while being significantly superior to all other treatments. The treatment T_7 resulted in the minimum leaf number (27.8), which was on par with T_1.

At five months after planting, T_6 produced maximum number of leaves (40.0) which was on par with T_3 and T_9. Treatment T_7 produced the minimum number of leaves (32.7) while being on par with T_4 and T_5.

At the time of application of growth regulator ethrel (applied 5½ months after planting for T_3, T_6 and T_9 and 6½ months after planting for T_1, T_2, T_4, T_5, T_7 and T_8), no significant difference was observed between the treatments with respect to the leaf number.

4.1.4 Length of 'D' leaf

Data showing the effect of various treatments on the average length of 'D' leaf at quarterly intervals are presented in Table 3.

Data indicated that at three months after planting, there was no significant difference among the treatments with regard to the length of leaf.

However, at six months after planting, T_9 recorded the maximum length of 85.6 cm and was on par with T_3 and T_6. The minimum length was recorded by T_4 and it was on par with T_1, T_2, T_5, T_7 and T_8.

4.1.5 Width of 'D' leaf

Data on the influence of various treatments on the mean width of 'D' leaf at quarterly intervals are given in Table 3

The treatments did not show any significant difference three months after planting.

At six months after planting, significant difference was noticed among the treatments. The maximum width of 'D' leaf was recorded in T_6 (6.1 cm) which was significantly superior to all other treatments except T_3 and T_9 with which it was on par. Treatments T_1, T_2 and T_4, were on par . The treatments T_7 and T_8 recorded the minimum value (4.6 cm).

4.1.6 Area of 'D' leaf

Data pertaining to area of 'D' leaf as influenced by the various treatments are shown in Table 3.

Table 3. Effect of treatments on 'D' leaf characters of pineapple var. Mauritius

Treatments	Length of 'D' leaf (cm)		Width of 'D' leaf (cm)		Area of 'D' leaf (cm^2)	
	3 MAP*	6 MAP*	3 MAP*	6 MAP*	3 MAP*	6 MAP*
T_1	48.5	57.0	3.7	5.0	130.2	209.5
T_2	48.5	60.7	3.7	4.9	133.6	218.5
T_3	50.7	74.9	3.7	6.0	137.1	313.1
T_4	48.4	54.8	3.5	5.2	124.4	207.9
T_5	49.9	55.5	3.4	4.7	123.1	192.0
T_6	55.2	78.5	3.8	6.1	152.2	350.8
T_7	50.1	60.0	3.6	4.6	132.6	203.5
T_8	51.3	58.2	3.4	4.6	129.1	195.8
T_9	56.2	85.6	3.8	6.0	154.9	374.9
SEm±	2.328	3.140	0.125	0.137	9.758	12.004
CD(0.05)	NS	9.413	NS	0.409	NS	35.990

* MAP - Months after planting; NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

According to the data, there was no significant difference among the treatments with regard to the area of 'D' leaf at three months after planting.

On the other hand, at six months after planting, T_9 showed significant superiority over other treatments (374.9 cm^2) while it was on par with T_6. Treatment T_3 was the next best treatment. The other treatments produced lower 'D' leaf area and were on par.

4.1.7 Leaf area

Data relating to the total leaf area per plant at quarterly intervals, are presented in Table 4.

The data showed that T_9 recorded the maximum leaf area (5299 cm^2) at three months after planting. It was on par with T_6 and T_3. The minimum value was shown by T_7 (3227 cm^2) which was on par with T_1, T_2, T_4, T_5 and T_8.

At six months after planting, T_6 recorded the maximum leaf area of 13078 cm^2 while being on par with T_3 and T_9. Treatment T_5 recorded the minimum leaf area of 7365 cm^2 which was on par with T_1, T_4, T_7 and T_8.

4.1.8 Leaf Area Index

Table 4 shows the data on the leaf area index as influenced by various treatments.

At three months after planting, the maximum leaf area index was recorded by T_9 (2.13) while being on par with T_3 and T_6. The other treatments were on par.

Table 4. Effect of treatments on leaf characters of pineapple var. Mauritius

Treatments	Leaf area (cm^2)		Leaf area index		Leaf production rate (per month)
	3 MAP*	6 MAP*	3 MAP*	6 MAP*	
T_1	3635 (3.560)	8303 (3.919)	1.46	3.35	3.9
T_2	3941 (3.585)	9103 (3.958)	1.59	3.67	3.6
T_3	4612 (3.663)	12222 (4.086)	1.86	4.93	3.3
T_4	3394 (3.528)	8027 (3.904)	1.37	3.24	3.3
T_5	3480 (3.541)	7365 (3.864)	1.40	2.97	3.2
T_6	5121 (3.708)	13078 (4.114)	2.06	5.28	3.2
T_7	3227 (3.506)	7575 (3.878)	1.30	3.06	3.3
T_8	3636 (3.557)	7599 (3.878)	1.46	3.07	3.3
T_9	5299 (3.724)	12790 (4.107)	2.13	5.16	3.1
SEm±	0.034	0.024	0.119	0.223	0.268
CD(0.05)	0.094	0.077	0.358	0.668	NS

Log values are given in brackets

* MAP - Months after planting; NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

At six months after planting, T_6 recorded a maximum value of 5.28. It was on par with T_3 and T_9. The minimum value of 2.97 was shown by T_5, which was on par with T_1, T_4, T_7 and T_8.

4.1.9 Leaf production rate

Data on the monthly leaf production rate as influenced by the various treatments are given in Table 4.

The data suggested that no significant difference was produced by the different treatments, with regard to leaf production rate.

4.1.10 Root:shoot ratio

Data relating to the effect of various treatments on root:shoot ratio are presented in Table 5.

From the data, it was seen that the treatments produced no significant difference in the root:shoot ratio.

4.1.11 Total dry matter production

The data on the total dry matter production as influenced by the treatments are given in Table 5.

The data indicated that the treatments had no significant influence on the total dry matter production.

Table 5. Effect of treatments on plant characters of pineapple var. Mauritius

Treatments	Root : shoot ratio	Total dry matter production (t/ha)	Harvest Index	No. of suckers/ plant	Percentage of suckers		
					High position	Medium position	Low position
T_1	0.02	30.60	29.3	1.4	17.4	68.4	14.2
T_2	0.02	33.46	28.3	1.3	41.4	45.1	13.5
T_3	0.03	31.76	29.8	1.6	24.0	59.4	16.6
T_4	0.03	31.44	32.4	1.8	20.4	64.6	15.0
T_5	0.02	29.35	33.6	2.0	17.6	68.0	14.4
T_6	0.03	33.83	31.5	1.8	14.0	67.8	18.2
T_7	0.02	30.39	31.9	1.2	24.5	65.9	9.6
T_8	0.03	33.98	29.9	1.7	24.1	67.6	8.3
T_9	0.03	32.87	28.9	1.1	16.1	69.4	14.5
SEm±	0.005	1.276	0.017	0.302			
CD(0.05)	NS	NS	NS	NS			

NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth;

4.1.12 Harvest Index

Data on the effect of various treatments on the harvest index are furnished in Table 5.

The data showed that there existed no significant difference between the treatments with regard to harvest index.

4.1.13 Number of suckers per plant

Data on the total number of suckers per plant, produced by the different treatments are given in Table 5.

The character under consideration was not significantly influenced by the various treatments.

4.1.14 Position of suckers

Data on the position of suckers on the mother plant, viz., low, medium and high are given in Table 5.

In all the treatments, the maximum percentage of suckers was found in the medium position with respect to the mother plant, which was followed by high position.

4.2 Flowering characters

Data on the influence of various treatments on the flowering characters are presented hereunder.

4.2.1 Days for physiological maturity for flowering

Treatments T_3, T_6 and T_9 attained physiological maturity for flowering (39-42 leaf stage) within a period of 5½ months after planting, while the treatments T_1, T_2, T_4, T_5, T_7 and T_8 attained physiological maturity within a period of 6½ months after planting.

4.2.2 Days for initiation of flowering

Data on the days for initiation of flowering as influenced by different size of suckers and method of planting are furnished in Table 6.

The treatment T_2 recorded the minimum time for initiation of flowering (30.8 days). The treatment T_6 took maximum time for initiating of flowering (36.8 days), which was on par with T_3, T_4, T_5 and T_9.

4.2.3 Days for 50 per cent flowering

Data on the effect of various treatments on the days for flowering of 50 per cent of the plants are presented in Table 6.

The treatment T_3 recorded the highest value (39.9 days) which was on par with all other treatments except T_2, which showed the lowest value (35.1 days).

4.2.4 Flowering phase

Data depicting the influence of treatments on flowering phase are presented in Table 6.

Table 6. Effect of treatments on flowering characters of pineapple var. Mauritius

Treatments	Days for initiation of flowering	Days for 50% flowering	Flowering phase (days)
T_1	32.0	38.8	16.6
T_2	30.8	35.1	16.9
T_3	36.4	39.9	19.0
T_4	34.3	38.6	15.1
T_5	35.1	39.1	15.3
T_6	36.8	39.7	18.7
T_7	31.4	36.4	13.5
T_8	31.4	36.3	13.8
T_9	36.0	39.4	18.0
Sem±	1.539	1.389	0.777
CD(0.05)	4.613	4.164	2.330

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth;

The highest value was recorded in T_3 (19.0 days), which was on par with T_1, T_2, T_6 and T_9. The lowest value was observed in T_7 (13.5 days) and it was on par with T_4, T_5 and T_8.

4.3 Fruit characters

Data on the fruit characters as influenced by the treatments are presented hereunder.

4.3.1 Fruit weight

Data on the effect of treatments on fruit weight with crown and without crown are given in Table 7.

The data indicated that there was no significant difference among the treatments with respect to fruit weight with crown or without crown.

4.3.2 Length of the fruit

Data on fruit length as affected by the different treatments are given in Table 7.

The maximum length of fruits was observed in T_9 (18.3 cm) which was on par with treatments T_1, T_2, T_3, T_4, T_6 and T_8. The lowest value for fruit length was recorded in T_7 (16.1 cm) and it ws on par with T_5.

4.3.3 Girth of the fruit

Data relating to the fruit girth as influenced by the treatments are given in Table 7.

Table 7. Effect of treatments on fruit characters of pineapple var. Mauritius

Treatments	Fruit weight (kg)		Fruit length (cm)	Fruit girth (cm)	Fruit breadth (cm)		
	With crown	Without crown			Top	Middle	Bottom
T_1	1.39	1.21	16.8	38.2	11.2	11.8	11.6
T_2	1.37	1.23	17.5	37.8	11.0	11.7	11.6
T_3	1.26	1.18	18.1	36.7	9.9	10.9	11.3
T_4	1.35	1.16	16.8	37.4	10.9	11.6	11.4
T_5	1.32	1.16	16.7	37.2	10.7	11.5	11.2
T_6	1.42	1.23	17.9	37.2	10.2	11.1	11.5
T_7	1.29	1.08	16.1	36.9	10.7	11.4	11.0
T_8	1.34	1.17	16.9	37.3	10.7	11.4	11.4
T_9	1.27	1.14	18.3	36.5	10.1	10.9	11.3
SEm±	0.051	0.048	0.465	0.301	0.132	0.112	0.156
CD(0.05)	NS	NS	1.394	0.904	0.398	0.337	0.467

NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

The treatment T_1 produced maximum girth of fruits (38.2 cm), which was on par with T_2, T_4 and T_8. The minimum girth of fruits was observed in T_9 (36.5 cm), and it was on par with all the treatments except T_1 and T_2.

4.3.4 Breadth of the fruit

Data pertaining to the breadth of the fruit at the top, middle and bottom portions are given in Table 7.

With regard to the fruit breadth at the top, the maximum breadth was obtained in T_1 (11.2 cm), which was significantly superior to T_3, T_5, T_6, T_7, T_8 and T_9. The minimum value was obtained in T_3, and it was on par with T_6 and T_9.

Similar trend was observed in the fruit breadth at the middle portion. The maximum value was recorded by T_1 (11.8 cm). The minimum value was produced by T_3 and T_9 (10.9 cm), which was on par with T_6.

However, a slight change was observed with respect to the fruit breadth at the bottom. All the treatments except T_7 were on par. Treatment T_1 and T_2 recorded the highest value (11.6 cm) while T_7 recorded the lowest value (11.0 cm).

4.3.5 L/B ratio

Data on the influence of various treatments on the L/B ratio are given in Table 8.

The highest L/B ratio was recorded by T_9 (1.70) and it was on par with T_3 and T_6. The lowest L/B ratio was observed in T_1 (1.45) and it was on par with T_2, T_4, T_5, T_7 and T_8.

Table 8. Effect of treatments on fruit characters, yield and crop duration of pineapple var. Mauritius

Treatments	L/B ratio	Taper ratio	Yield (t/ha)	Days for maturity	Crop duration (days)
T_1	1.45	0.96	56.50	92.3	351
T_2	1.53	0.94	55.59	94.6	341
T_3	1.68	0.88	51.07	94.8	305
T_4	1.48	0.96	54.84	92.5	352
T_5	1.49	0.95	53.48	93.8	351
T_6	1.62	0.88	57.66	95.4	304
T_7	1.46	0.96	52.34	93.4	351
T_8	1.51	0.93	54.37	93.8	346
T_9	1.70	0.89	51.33	95.7	302
SEm±	0.036	0.005	2.111	0.460	2.096
CD(0.05)	0.109	0.017	NS	1.380	6.284

NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

4.3.6 Taper ratio

Data relating to the taper ratio as affected by the various treatments are presented in Table 8.

According to the data higher values of taper ratio were recorded by T_1,T_4 and T_7 (0.96). The lowest value was observed in T_3 and T_6 (0.88) and it was on par with T_9.

4.3.7 Yield per hectare

Data relating to the yield per hectare are presented in Table 8.

With respect to the yield per hectare, there was no significant difference between the treatments.

4.3.8 Days for fruit maturity

Data pertaining to the number of days taken from inflorescence emergence to fruit maturity are presented in Table 8.

From the data it was seen that the treatment T_1 recorded the minimum time for fruit maturity (92.3 days), and it was on par with T_4, T_5, T_7 and T_8. Treatment T_9 recorded the maximum time for fruit maturity (95.7 days) while being on par with T_2, T_3 and T_6.

4.3.9 Crop duration

Data depicting the crop duration as influenced by the treatments are shown in Table 8.

Treatment T_9 recorded the minimum crop duration (302 days) and it was on par with T_3 and T_6. Among the other treatments, T_4 showed the maximum crop duration (352 days), but it was on par with T_1, T_5, T_7 and T_8 (Fig.3).

4.4 Fruit quality

The influence of various treatments on the fruit quality is discussed hereunder.

4.4.1 Juice content

Data pertaining to the juice content of fruits as affected by the treatments are shown in Table 9.

The character under consideration was not significantly influenced by the treatments.

4.4.2 Total Soluble Solids (TSS)

Data pertaining to the total soluble solids as influenced by the treatments are given in Table 9.

The data revealed that there was no significant difference among the treatments with regard to the TSS.

4.4.3 Titrable acidity

Data on titrable acidity are presented in Table 9.

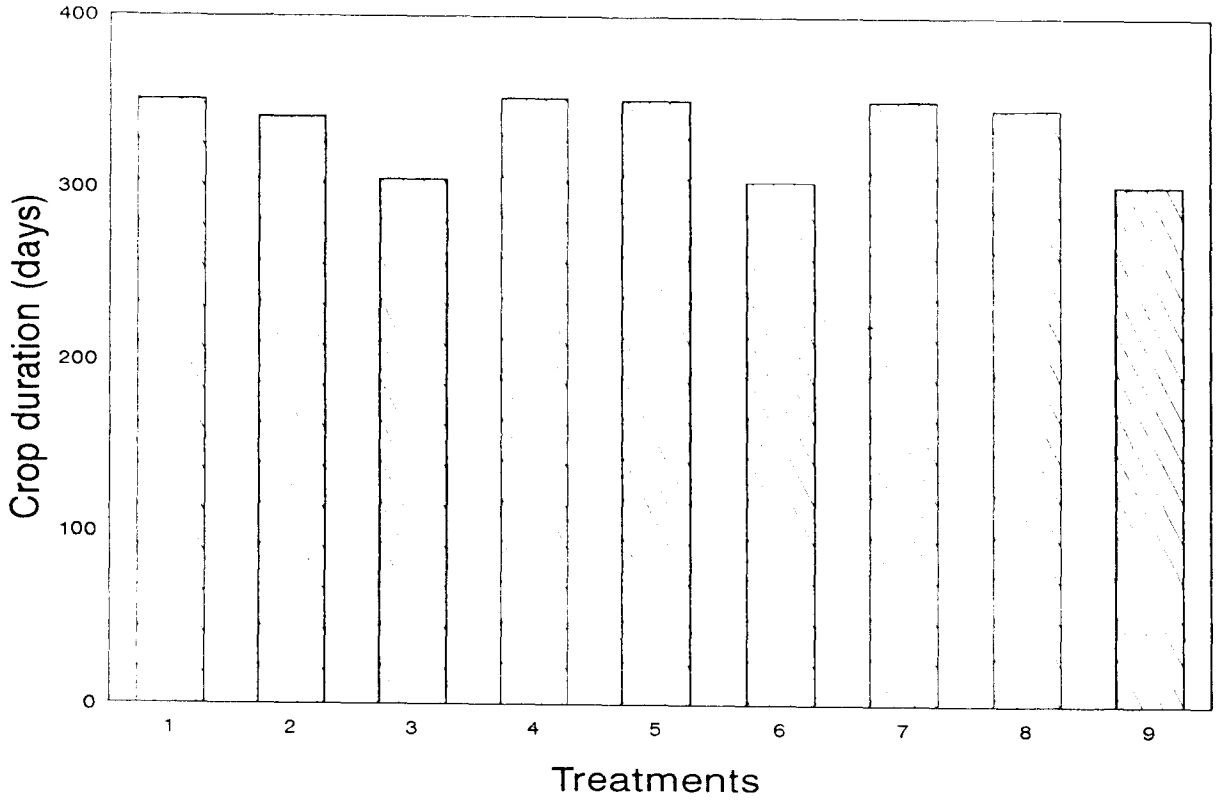


Fig.3. Effect of treatments on crop duration

Table 9. Effect of treatments on fruit quality of pineapple var. Mauritius

Treatments	Juice content (%)	TSS (°Brix)	Titrable acidity (%)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)	Ascorbic acid (mg/100 g)
T_1	60.82	12.5	0.83	14.69	4.40	10.28	14.23
T_2	59.68	12.4	0.78	12.22	3.75	8.47	10.83
T_3	55.73	12.5	0.68	11.31	3.12	8.19	8.28
T_4	63.31	12.5	0.80	12.42	3.31	9.10	18.66
T_5	64.43	11.9	0.88	13.44	3.76	9.71	16.97
T_6	59.63	11.4	0.74	12.13	3.56	8.57	7.50
T_7	62.80	12.5	0.79	13.27	3.85	9.41	12.92
T_8	62.62	11.7	0.86	13.56	3.86	9.70	11.63
T_9	59.44	11.9	0.71	13.02	3.07	9.92	7.24
SEm±	3.051	0.342	0.044	0.592	0.292	0.590	1.909
CD(0.05)	NS	NS	NS	1.777	0.877	1.769	5.723

NS - Non significant

T_1 - 500 g sucker + ground level; T_2 - 750 g sucker + ground level;
T_3 - 1000 g sucker + ground level; T_4 - 500 g sucker + 15cm trench depth;
T_5 - 750 g sucker + 15cm trench depth; T_6 - 1000 g sucker + 15cm trench depth;
T_7 - 500 g sucker + 30cm trench depth; T_8 - 750 g sucker + 30cm trench depth;
T_9 - 1000 g sucker + 30cm trench depth

The data showed that the treatments did not differ significantly with regard to titrable acidity.

4.4.4 Total sugars

Data on the total sugar content of the fruit are presented in Table 9.

Treatment T_1 recorded the maximum content of total sugars (14.69%) and it was on par with T_5, T_7, T_8 and T_9. Treatment T_3 produced the lowest value (11.31%), while being on par with T_2, T_4 and T_6.

4.4.5 Reducing sugars

From the data presented in Table 9, it was seen that T_1 had maximum content of reducing sugars (4.40%) and it was on par with T_2, T_5, T_6, T_7 and T_8. The lowest value was shown by T_9 (3.07%).

4.4.6 Non-reducing sugars

Data on the non-reducing sugar content of the fruit are given in Table 9.

The non-reducing sugars was maximum in treatment T_1 (10.28%) which was on par with all the other treatments except T_3. The treatment T_3 recorded the minimum non-reducing sugars (8.19%).

4.4.7 Ascorbic acid

Data on the influence of treatments on the ascorbic acid content of the fruit are presented in Table 9.

As per the data, the treatment T_4 showed the highest value (18.66 mg/ 100 g fruit), and was on par with T_1, T_5 and T_7. The treatment T_9 showed the lowest value (7.24 mg/100 g fruit) and it was on par with T_3 and T6.

Discussion

DISCUSSION

The present investigations were carried out at the Kerala Horticulture Development Programme, Kerala Agricultural University, Vellanikkara, during 1994-96 with a view to standardise the optimum size of sucker and suitable method of planting for pineapple variety Mauritius. The salient results of the study are discussed hereunder.

Mauritius is the leading pineapple variety of Kerala grown commercially in Ernakulam, Kottayam and Idukki districts. It is preferred over Kew variety due to its pleasant flavour, excellent taste and long storage life. However, the package of practices recommendations of the Kerala Agricultural University, which are based on studies conducted in Kew variety, are unsuitable for Mauritius variety.

Though pineapple is propagated by vegetative means by using suckers, slips, crowns and hapas (Collins, 1949), suckers are the most preferred planting material, as they produce the most vigorous plants with the least crop duration (Chadha and Singh, 1993). However, the use of different sizes of planting material leads to poor rate of establishment, uneven growth, staggered flowering and production. This makes uniform cultural operations difficult and thereby increases the cost of production. In variety Mauritius also, suckers of different sizes are used by the farmers, to stagger the time of harvest. Generally larger suckers are used and the crop duration is less than a year for Mauritius variety. Hence, an attempt was made to standardise the size of suckers to obtain optimum yield with less duration.

In Kerala, pineapple is planted on level ground, raised bunds, in beds or trenches, depending on local preferences (Balakrishnan *et al.*, 1977). The method of planting should be selected so as to bring down the cost of cultivation to the extent

possible, at the same time ensuring optimum growth and yield. Hence, attempts were made to study the influence of different methods of planting in Mauritius variety in combination with the size of suckers.

5.1 Vegetative characters

Plants of all the treatments showed 100 per cent establishment, indicating that the size of planting material or the method of planting did not influence the survival percentage.

Growth in pineapple is determined by the height, number of leaves, 'D' leaf weight and leaf area (Singh *et al.*, 1978).

In the present study, planting large suckers (1000 g) resulted in more plant height, than those of medium (750 g) and small (500 g) suckers, at all stages of growth. This finding is in conformity with the works of Py (1960), Mitchell (1962), Wang and Kwang (1967) and Reynhardt and Dalldorf (1968).

Leaf number is one of the most important criteria of plant growth, as it is a measure of the photosynthetic ability of the plants and thereby the total yield. The present investigations point out that the plants derived from large suckers produced more number of leaves at all stages of growth, than those from medium and small suckers. However, at the time of ethrel application, no significant difference was observed between the treatments, with respect to the leaf number. This indicates that while the initial growth of plants was influenced by the size of suckers, the small and medium sized suckers were able to cope up with the large suckers and ultimately at the stage of completion of the vegetative phase, the differences were nullified. The steady increase in the production of effective leaves upto flowering in

all the treatments, could be traced to the non-abscission of the older leaves during the growth period (Collins, 1960). The findings of the present investigations are in line with the works of Py (1960), Chadha *et al.* (1974a), Singh and Singh (1975), Norman (1976), Balakrishnan *et al.* (1981), Varkey *et al.* (1984) and Ahmed and Mohan (1985) in pineapple. Similar results were also reported by Prasanna (1983) in banana.

However, the method of planting did not influence the plant height or leaf number.

Since the leaves constitute the major photosynthetic apparatus of a plant, the study of leaf area has been the subject of intensive research in several crop plants (Nichiporovich, 1954; Watson, 1956; Pandey *et al.*, 1978). In pineapple, the most important whorl of leaves are the 'D' leaves, which are described as the youngest, physiologically active whorl. In the present study, the size of sucker had no significant influence on the length, breadth and area of 'D' leaf at three months after planting. However, at six months after planting, the size of 'D' leaf was found to be more for plants derived from large suckers. This may be due to the fact that at six months after planting, the plants derived from 1000 g suckers had reached the stage of maximum vegetative growth and were physiologically mature for flowering, whereas the medium and small suckers, were still in their vegetative phase. Similar results were obtained by Balakrishnan *et al.* (1981) and Ahmed and Mohan (1985) in variety Kew.

However, the length, breadth and area of 'D' leaf were not influenced by the method of planting. This was a deviation from the finding of Radha *et al.* (1990) that in Kew variety, the length and area of 'D' leaf increased with the depth of

trenches six months after planting, while they were not manifested one year after planting.

The total leaf area and leaf area index which are also important measures of vegetative growth, were found to increase with the increase in size of suckers. This could be attributed to the production of bigger successive leaves, increasing leaf number due to the non-abscission with the advancement of growth and retention of turgidity of all the leaves present on the plant in large suckers (Collins, 1960; Ekern, 1968; Lacoeuilhe and Py, 1974). All these might have resulted in augmented values of leaf area and leaf area index.

The method of planting had no significant influence on the total leaf area or the leaf area index. This might be due to the fact that the planting method did not produce significant difference in the length, breadth and number of leaves produced by the plant at any stage of growth.

The total dry matter production ranged from 29.35 to 33.98 t/ha. The results indicated that there was no considerable influence of different treatments on dry matter production. This might be due to the lack of influence of size of sucker and method of planting on leaf production rate and subsequent development after flowering. It is also worth mentioning here that, while the plants from large suckers were induced to flower at 5½ months after planting, the plants from medium and small suckers were subjected to induction of flowering, only at 6½ months after planting, on attaining 39-42 leaf stage. Hence, plants from all the treatments had sufficient vegetative growth at flowering, which might have contributed to the lack of difference in dry matter production at harvest.

The fact that there occurred no reduction in dry matter production by using smaller suckers, suggests the suitability of this type of planting material for commercial planting.

An attempt was made to compare the harvest indices of pineapple variety Mauritius under different treatments. The harvest index was not found to vary under different treatments. The parity observed in this aspect clearly indicates that Mauritius variety is highly adaptable for planting with different sized suckers under different methods of planting.

The size of sucker or method of planting did not exert any significant influence on the production of suckers. The number of suckers produced per plant was low which ranged from 1.1 to 2.0. In the present study, high density planting accommodating 40,404 plants per hectare was followed for all the treatments. This increased planting density might have influenced the sucker production rather than the treatments as reported by Treto *et al.* (1974). This finding is in agreement with the works of Mitchell (1962); Chadha *et al.* (1974a); Norman (1980) and Ahmed and Mohan (1985).

Thus, larger suckers (1000 g) exhibited better vegetative growth compared to medium and small suckers. They showed more vigour in terms of plant height, leaf number, leaf area and 'D' leaf area. Sufficient stored food material in the large suckers at the time of planting, could be the reason for the vigorous growth of the plants derived from them (Chadha *et al.*, 1974a).

5.2 Flowering characters

In the present study, the size of suckers were found to have considerable influence on the flowering characters.

The physiological maturity of the plants, indicated by the presence of 39-42 leaves, is considered as the right stage for induction of flowering using ethrel in pineapple. Within a cultivar, puberty (receptivity to flowering stimulus) tends to

be reached at a constant physiological age rather than after a constant time from planting (Bleasdale, 1973). The size of suckers influenced the time taken by the plants to attain this stage. Large suckers (1000 g) reached this stage, at about 5½ months after planting, while the medium and small suckers took 6½ months. Enhanced vegetative growth put forth by the plants derived from large suckers might be the reason for the early attainment of physiological maturity by them. Every additional gram in the planting material size had a stronger effect on early blossoming in pineapple, as reported by Pennock and Gandia (1975). Studies conducted by Chadha *et al.* (1974a), Singh and Singh (1975) and Norman (1976) are also in conformity with this finding.

Furthur perusal of the results indicates that though the small suckers exhibited less vegetative growth initially, they were able to cope up with the medium suckers at the later stages and the physiological maturity was attained by both the groups at almost the same time. This could be mainly attributed to the increased leaf production in small suckers, during the peak vegetative period.

The size of suckers also influenced the flowering phase of the plants. Plants derived from large suckers exhibited a longer flowering phase (18-19 days) when compared to the plants from medium and small suckers (13-16 days). The elongated flowering phase in large suckers might be due to the increased number of flowers in the inflorescence, as indicated by the longer fruits produced by these plants. These results are in agreement with the reports of Chadha *et al.* (1974a).

5.3 Fruit and yield characters

The fruit being the economically important part of pineapple, the prime objective of any agro-technique adopted should be to improve the size, yield and quality of the fruit.

Results showed that the mean fruit weight (with and without crown) and the yield per hectare were not significantly influenced by the size of suckers. The suckers of different sizes performed similarly in their production potential, indicating the lack of carry over effect of the planting material on the resultant crop. It may be noted here that the vegetative phase was more in plants derived from medium and small suckers, which could have helped them to produce similar yield as that of large suckers. Though the yields were the same, the plants from large suckers took lesser number of days to produce this yield. Hence, taking the crop duration also into account, the plants from large suckers may be considered to be higher yielders when compared to medium and small suckers. This finding is in conformity with the reports of Balakrishnan *et al.* (1981); Ahmed and Mohan (1985) and Reinhardt *et al.* (1987). In banana, the lack of significant influence of sucker size on yield has been reported by Bhan and Majumdar (1958) and Prasanna (1983).

The results of the present study also point out the fact that plants in all the treatments had uniform leaf number (39-42) at the time of induction of flowering. Hence, all the plants had similar photosynthetic efficiency, which could have resulted in uniformity in fruit weight and yield. According to Py (1953), a variation of 10 leaves is required to bring about a difference of 0.5 kg in fruit weight.

The method of planting had no significant influence on the mean fruit weight or yield per hectare. This is on similar lines with the results obtained by Balakrishnan *et al.* (1977) and Radha (1990), in variety Kew. The lack of significant influence of the method of planting on the leaf number, leaf area and dry matter production might be the reason for this result. Further, the genetic potential, adaptation to environment, soil type and management practices might have exerted a stronger influence on the yield, rather than the method of planting. The soil

moisture status varies at different depths of soil, which contributes to the differences in plant growth and yield. However, in the present study, the soil type was laterite, with high water holding capacity even on the surface. This might also be a reason for the lack of significant influence of the method of planting, on the vegetative characters, fruit characters and yield per hectare.

The present investigations have clearly shown that the fruit length increased with increase in sucker size. The fruit length was more in plants raised from 1000 g suckers, followed by those from 750 g and 500 g suckers. The probable reason for this, as suggested earlier, might be the increased number of flowers in the inflorescence, which was inferred from the extended flowering phase in plants from large suckers. Reports by earlier workers are in agreement with this (Singh and Singh, 1975; Norman, 1976; Tay and Wee, 1976).

Small and medium suckers (500 g and 750 g respectively) gave fruits with higher mean breadth, while the use of large suckers (1000 g) reduced the fruit breadth. With respect to the girth of fruit also, the treatments exhibited a similar trend.

The L/B and taper ratio are more important as far as the suitability of fruits for canning is concerned. Mauritius being a variety mainly used for table purposes and juice making, these parameters are not of much significance. However, the size of suckers influenced these characters. The L/B ratio was more for fruits from large suckers, followed by those from medium and small suckers. This could be attributed to the greater fruit length observed in the case of large suckers. Longer fruits generally, have better consumer acceptibility. Hence, large suckers could be used to produce fruits with greater consumer preference.

The taper ratio, on the other hand exhibited an opposite trend.

The method of planting had no significant influence on the L/B or taper ratio. This is in conformity with the results obtained by Radha *et al.* (1990).

The duration from flowering to harvest was influenced by the size of sucker in the present investigations. Plants from small suckers (500 g) took minimum duration from flowering to harvest and plants from large suckers (1000 g), the maximum. Similar results have been reported by Chadha *et al.* (1974a). In banana, Prasanna (1983) observed that the number of days from shooting to harvest was highest in the case of largest suckers.

The total crop duration is of much more importance than the days taken for fruit maturity from the growers point of view. The plant crop could be harvested in 302-305 days in the case of large suckers compared to 341-352 days in medium and small suckers. This could be attributed to the early flowering observed in 1000 g suckers. It may be noted here that when the plants from 1000 g suckers attained the fruiting stage (Plate 2), the plants from 750 g and 500 g suckers were at the flowering stage (Plates 3 and 4 respectively). Reports by earlier workers are in agreement with this (Senewiratne, 1964; Reynhardt and Dalldorf, 1968a and Chadha *et al.*, 1974a).

The method of planting did not significantly influence the time taken for fruit maturity or crop duration.

The fruit quality in terms of juice content, TSS and acidity were unaffected by the size of planting material. This is in conformity with the reports of earlier workers like Chadha *et al.* (1974a), Singh and Singh (1975), Norman

Plate 2. Plants from 1000 g suckers at fruiting stage (8½ months after planting)

Plate 3. Plants from 750 g suckers at flowering stage (8½ months after planting)


R3 T9

Plate 4. Plants from 500 g suckers at flowering stage (8½ months after planting)


R2 T4

(1976), Tay and Wee (1976), Norman (1980), Ahmed and Mohan (1985) and Gonzalez-Tejera (1986). This is as expected, since the planting materials were selected from the same stock and the genotype for the fruit quality remains the same.

The foregoing discussions on the results generated from the present study indicate that large suckers (1000 g) perform better, in terms of enhanced vegetative growth, normal yield and lesser crop duration. This suggests the possibility of using them as planting material for the variety Mauritius especially in commercial cutlivation. The medium and small suckers (750 g and 500 g respectively) were found to perform alike. Hence, if the fruits are to be harvested at a later stage, or if the production has to be staggered, they can also be used. The use of such suckers reduces the cost and their size is advantageous for transportation to distant places.

The results indicated that the method of planting did not have any significant influence on the growth, yield and quality of pineapple variety Mauritius. Most of the characters were unaffected by the method of planting. This suggests that pineapple can be planted, either at ground level or in trenches of 15 cm or 30 cm depth. However, taking into consideration the labour charges for preparation of trenches, surface planting is recommended for plant crop in pineapple. Plant crop along with two ratoon crops is preferred in pineapple. The variety Mauritius is also cultivated under this system. The influence of the method of planting on the growth and performance of the ratoon crops in Mauritius variety is a topic for furthur investigation.

Detailed studies on fertilizer application, irrigation, shading etc. are necessary to obtain conclusive results on the cultivation aspects of pineapple variety Mauritius. Future research in these aspects will be useful.

Summary

SUMMARY

Studies on the influence of size of sucker and method of planting on the growth and yield of pineapple variety Mauritius were carried out at the Department of Pomology and Floriculture, College of Horticulture, Vellanikkara, from June 1995 to June 1996. The experiment was laid out at the Kerala Horticulture Development Programme, KAU Main Campus, Vellanikkara. The main objective of the trial was to evaluate the growth and yield of pineapple variety Mauritius using suckers of three sizes, viz., 500 g, 750 g and 1000 g, planted under three methods of planting, viz., at ground level, in trenches of 15 cm depth and in trenches of 30 cm depth. The salient results of the study are summarised here.

The influence of size of sucker and method of planting on the growth characters was clearly evident at different stages of growth.

At all the stages, suckers weighing 1000 g irrespective of the method of planting were found to produce more plant height. Suckers of 500 g planted in all methods recorded lesser height at early stages of growth, while at later stages, they were on par with suckers of 750 g.

- With regard to the number of leaves, suckers of 1000 g irrespective of the method of planting recorded the maximum value at all the stages.

The length, breadth and area of 'D' leaf did not show significant difference at three months after planting. However, at six months after planting, suckers of 1000 g irrespective of the method of planting showed significant superiority, with respect to the 'D' leaf characters.

Regarding the total leaf area per plant and leaf area index at quarterly intervals, suckers of 1000 g planted in all the methods proved to be significantly superior.

The leaf production rate, root:shoot ratio, total dry matter production, harvest index and number of suckers per plant were not significantly influenced by the various treatments. With regard to the position of suckers, the maximum percentage of suckers was found in the medium position in all the treatments. The minimum percentage of suckers was found in the low position in all the treatments, except in suckers weighing 1000 g, planted in 15 cm deep trenches.

Suckers weighing 1000 g attained the physiological maturity for flowering within 5½ months after planting, while suckers weighing 750 g and 500 g took one more month to attain physiological maturity for flowering.

Regarding the number of days taken for initiation of flowering and for 50 per cent flowering, suckers weighing 500 g and 750 g, planted in all methods showed the lowest values.

The minimum flowering phase was observed in suckers weighing 500 g and 750 g, irrespective of the method of planting.

The fruit weight with and without crown and yield per hectare were not significantly influenced by the treatments.

Fruit length was more when larger suckers were used. But higher fruit girth and fruit breadth was produced from smaller suckers planted at ground level or in trenches of 15 cm depth.

The L/B ratio was the highest for suckers weighing 1000 g. The lowest value was recorded by suckers of 500 g, but they were on par with suckers of 750 g. However, the taper ratio was higher for small suckers (500 g) and lower for suckers weighing 1000 g, irrespective of the method of planting.

Suckers weighing 1000 g, planted in all methods and suckers weighing 750 g planted at ground level, took more days for fruit maturity, while planting suckers weighing 500 g resulted in less days for fruit maturity.

The total crop duration was less for suckers weighing 1000 g, planted in all the methods. Suckers weighing 500 g and 750 g, irrespective of the method of planting was found to result in more crop duration.

The juice content, total soluble solids and titrable acidity were not affected by various treatments. The higher values for total, reducing and non-reducing sugars were observed in suckers weighing 500 g and 750 g, irrespective of the method of planting. Small and medium sized suckers also produced fruits with more ascorbic acid content than large suckers.

The crop duration could be reduced by 40 days using suckers weighing 1000 g. Planting small and medium sized suckers resulted in crops of the same duration. However, the method of planting had no significant influence on crop duration.

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*Originals not seen

Appendix

APPENDIX - I

Weather data of the experimental site at monthly intervals

Year	Month	Total rainfall (mm)	Temperature (°C)		Mean relative humidity (%)	Mean sunshine (hrs)
			Maximum	Minimum		
1995	June	500.4	31.6	23.1	86	3.7
	July	884.7	29.9	23.2	89	2.1
	August	448.7	30.6	23.7	86	3.7
	September	282.5	30.1	23.5	82	6.1
	October	110.4	33.2	23.2	78	8.3
	November	88.4	31.3	22.5	80	6.5
	December	0.0	32.5	21.3	57	10.3
1996	January	0.0	33.1	22.4	53	9.4
	February	0.0	34.7	23.4	53	9.9
	March	0.0	36.4	24.3	60	9.3
	April	152.0	34.6	25.0	73	8.3
	May	95.4	32.8	25.2	77	7.7
	June	400.3	30.5	23.8	85	4.7

INFLUENCE OF SIZE OF SUCKER AND METHOD OF PLANTING ON THE GROWTH AND YIELD OF PINEAPPLE VAR. 'MAURITIUS'

By

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ABSTRACT OF A THESIS

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ABSTRACT

An experiment was carried out at the Kerala Horticulture Development Programme, College of Horticulture, Vellanikkara, to evaluate the influence of size of sucker and method of planting on the growth and yield of pineapple variety Mauritius. Suckers of three sizes, viz., 500 g, 750 g and 1000 g, and three methods of planting, viz., planting at ground level, in trenches of 15 cm depth and in trenches of 30 cm depth were used.

Results revealed that the size of suckers had significant positive influence on the overall vegetative growth. Suckers weighing 1000 g were found to be significantly superior to those weighing 750 g and 500 g, with respect to resultant height of plants, number of leaves and leaf area. Plants raised from suckers weighing 750 g and 500 g performed similarly.

The leaf area index was found to be more in plants derived from large suckers (1000 g), compared to those derived from medium and small suckers.

Larger suckers (1000 g) reached the physiological maturity for flowering (39-42 leaf stage), one month earlier than smaller suckers (750 g and 500 g).

The initiation of flowering was quicker in plants derived from medium and small suckers.

The time taken for 50 per cent flowering was lesser for plants derived from medium and small suckers.

Planting large suckers in all the methods resulted in longer flowering phase.

The fruit weight (with or without crown) and yield per hectare were not significantly influenced by size of suckers.

But the total crop duration was lesser for plants raised from large suckers when compared to medium and small suckers.

The sugar content was more in plants derived from small and medium sized suckers.

The method of planting did not have much significant influence on the growth and yield characters. This suggests that ground planting is sufficient in pineapple variety Mauritius, which can reduce the cost of cultivation thereby increasing the profitability of the farmer.