# STUDIES ON FOUR CULTIVARS OF BANANA IN THE JAFFNA PENINSULA, SRI LANKA

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Vingnanam Journal of Science 5:1—6 (1990)

**ABSTRACT**: Studies on four cultivars of banana 'Mysore' (Kathali), 'Silk' (Kappal), 'Bluggoe' (Mondan-ash) and 'Watha palu' (Etharai) commonly cultivated in the Jaffna Peninsula, Sri Lanka, showed no significant difference among the cultivars with respect to their height and number of leaves/plant. Variation was observed in length of bunch, number of combs/bunch, total number of fingers/bunch and in the period of fruit maturation. Kathali showed the highest yield (number of fingers/bunch). Total sugar in ripe fruits varied from 20·21 to 28·33% (fresh weight) and showed no significant variation among the cultivars but % reducing sugar was much higher in 'Kathali' and 'Etharai'.

## Introduction

The edible banana cultivars of importance in Sri Lanka are triploids and belong to AAA, AAB and ABB groups. The important cultivars are Gross michel and Dwarf cavendish belonging to AAA group; Mysore, Silk, Pome and Watha palu belonging to AAB group; and Bluggoe belonging to ABB group (Simmonds 1966). In Sri Lanka bananas are grown in the low country wet zone and in the dry zone including Jaffna peninsula in the north. It is grown under rain fed conditions in most places, but in the Jaffna peninsula it is cultivated under irrigation.

This paper describes the chief cultivars grown in the Jaffna peninsula. Mysore, Silk, Bluggoe and Watha palu cultivars dominate in Jaffna. These are referred under the following local names Kathali, Kappal, Mondan (Ash) and Ethari respectively. Of these, Kathali is cultivated extensively and it is highly resistant to Panama and leaf spot diseases (Simmonds 1966). Silk (Kappal) is susceptible to panama disease. Bunchy top disease is widely spread in Sri Lanka (Abeygunawardena, 1969) and this is the most common disease also among the cultivars in Jaffna.

No previous study has been reported on these cultivars and this paper deals with some morphological studies of the plant, fruit and biochemical analysis of the ripe fruits.

## Materials and Methods

This project was conducted on well maintained banana cultivars at Urumpirai, Sirupiddy and Neervely in the Jaffna peninsula. The chemical status of the soils of the three places are similar; they are of the red latasols. The levels of the soil nutrients during the period of cultivation were within the range of adequacy for bananas. Sword suckers were used as propagules. Plants were spaced 2·5 $m^2$ at a depth of 30 cm. The normal cultivation practices were maintained throughout the study.

### Growth parameters

Pseudostem height estimated as the distance from the base of the pseudostem to the point of intersection of the petioles of the youngest leaves was used as an index of growth. The heights of 50 plants at random for each variety were measured. Pseudostem girth was measured at different levels from the ground. The number of leaves at bunch emergence was counted in 50 plants selected at random for each variety. Time between flower initiation and harvesting was also measured.

### Yield parameters

The length of the entire bunch, number of hands/bunch and number of fingers/bunch were measured as an index of yield. Length of the bunch was defined as the distance from the base to the maximum curvature when the bunch was kept straight. The above parameters were measured in 50 bunches selected at random for each cultivar.

### Biochemical analysis

The ripe fruits of the four cultivars were analysed for moisture, mineral/ash, nitrogen, protein, reducing sugar and total sugar content. Fruits with good appearance, free from any disease and almost of the same stage of maturation, were selected for this analysis.

Moisture content was determined by drying a known weight of the sample at 105°C to a constant weight. A known weight of the dried sample was ashed at 480°C to a constant weight to determine the mineral/ash content. Percentage of reducing and total sugar was estimated by the Somogyi's semi-micro method (AOAC 1960). The percentage of total nitrogen in 1 g fresh sample was determined by the micro-kjeldahl method (AOAC 1950). The total nitrogen content was multiplied by 6·25 to obtain the total percentage protein.

## Results and Discussion

The results of plant height, girth and number of leaves/plant are given in Table 1. The results show that there were no significant differences among the varieties in their height and in the number of leaves/plant. The mean height varied from 3·5 to 3·8 m. Girth size showed some variation, greatest girth size for Kappal and the least for Sambal mondan. The girth size variation was more significant at 50 cm from the soil.

**Table 1.** Growth parameters of the four cultivars of banana

( Sample size, n = 50 )

| Cultivar | Height of the pseudostem (m) (Mean ± S.E) | Girth of final pseudostem at different levels from the ground (cm) (Mean ± S. E) | | | Number of leaves at bunch emergence (Mean ± S. E) |
|---|---|---|---|---|---|
| | | 25 cm from the ground | 50 cm from the ground | 100 cm from the ground | |
| Kathali | 3·68±·06 | 86·41±2·32 | 76·08±2·02 | 63·43±1·66 | 13±·64 |
| Etharai | 3·90±·19 | 79·20±3·80 | 71·06±3·24 | 60·60±2·62 | 11±·62 |
| Kappal | 3·56±·07 | 87·89±2·50 | 81·16±2·27 | 65·38±1·69 | 13±·68 |
| Sampal mondan | 3·80±·36 | 79 03 ±3·84 | 70·85±3·28 | 60·62±2·75 | 15±·73 |

The results of yield parameters are given in Table 2. It shows that there is variation in length of the bunch, number of combs/bunch, total number of fingers/bunch and in the period of fruit maturation. Sambal mondan matures faster (nearly 2½ months) than the others. Etharai takes a longer period (nearly 4½ to 5 months) for the fruits to mature

**Table 2.** Yield parameters of the four cultivars of banana

(Sample size, n = 50)

| Cultivar | Length of the bunch (cm) (Mean ± S E) | Number of hands/bunch (Mean ± S E) | Number of fingers/bunch (Mean ± S E) | Period of fruit maturation in days (Mean ± S E) |
|---|---|---|---|---|
| Kathali | 60·8±2·65 | 13±·50 | 241±12·92 | 100 |
| Etharai | 51·15±4·0 | 8±·42 | 99± 9·09 | 140 |
| Kappal | 59·03±4·63 | 8±·68 | 121±14·30 | 105 |
| Sambai mondan | 50·93±3·33 | 6±·26 | 82± 5·58 | 70 |

Kathali produces larger bunches with more fingers. Among the four cultivars, Kathali is the best with regard to yield and also the fruits mature in reasonably short period of time. The above considerations may have led to the popularity of this cultivar among the growers in the Jaffna peninsula.

Moisture and mineral/ash content of the ripe fruits of the varieties are given in Table 3. The results indicate that the skin has more moisture content than the pulp although the pulp appears soft. The moisture content of the skin showed no significant differences among the varieties. It ranged from 85 – 87%. But the moisture content of the pulp varied among the varieties. Out of the three varieties Kathali, Etharai and Kappal which are commonly consumed as ripe fruits, the pulp of the varieties Etharai and Kappal are relatively dry and hard and this accounts for the lower moisture content as observed in our studies. The skin contains more mineral/ash content than the pulp. The ash content of the pulp ranged from 3 – 5% while the ash content of the skin ranged from 11–15%. There was no varietal difference in mineral / ash content of either the skin or the pulp.

Table 3 Comparison of moisture and mineral ash content of the ripe fruits of banana

| Cultivar | Moisture % | | Dry matter % | | Mineral/ash content % of fresh weight | | Mineral/ash content % of dry weight | |
|---|---|---|---|---|---|---|---|---|
| | skin | pulp | skin | pulp | skin | pulp | skin | pulp |
| Kathali | 84·91 | 77·99 | 15·09 | 22·01 | 1·78 | 1·15 | 11·66 | 5·22 |
| Ethari | 85·45 | 71·18 | 14·55 | 28·82 | 2·26 | 1·11 | 15·54 | 3·83 |
| Kappal | 86·91 | 73·71 | 13·09 | 26·29 | 1·91 | 1·36 | 15·34 | 5·13 |
| Sambal mondan | 85·09 | 63·88 | 14·92 | 36·12 | 1·60 | 1·40 | 10·95 | 3·74 |

The analysis of reducing, total sugar and acidity of the ripe fruit pulp is given in Table 4. The total sugar content ranged from 16·75 to to 28·33%. Except for the Kappal (28.33%), all other varieties did not show any significant difference in the amounts of the total sugar. However the proportion of reducing sugar and sucrose in the pulp showed significant variation. In Kathali and Ethari, the proportion of reducing sugar was greater while this was reversed in Kappal. This explains why Kathali and Ethari are generally sweeter in taste compared to Kappal. They have more reducing sugars in the form of fructose and glucose than Kappal, which accounts for the extra sweetness. Of these varieties Kathali has a pleasant sour taste due to the higher acid content. The same variety grown in other parts of Sri Lanka, is referred to as 'Ambul'. 'Ambul' in Sinhala means sour.

Table 4 Reducing sugar and total sugar content of the ripe banana fruits

| Cultivar | Reducing sugar % (fresh weight) | Total sugar % (fresh weight) |
|---|---|---|
| Kathali | 16·38 | 21·58 |
| Ethari | 17·33 | 23 04 |
| Kappal | 9·67 | 28·33 |
| Sambal mondan | 9·71 | 20·21 |

Nitrogen and protein content of the ripe fruits are given in Table 5. The results indicate that the skin and pulp of the fruits had almost equal amounts of protein and also there was no varietal difference. Only Sambal mondan and White mondan are used as vegetables and even there, in the traditional cooking in Jaffna, most of the skin is removed. Therefore from the point of nutrition, it is the pulp that is important in all these varieties. In our study we have only considered the reducing sugar and sucrose in estimation of the total sugars. There may be other disaccharides and polysaccharides in fruit which will contribute to the net caloric value of the fruit. Further studies on the starch, ascorbic acid and free amino acid content of these cultivars are in progress.

**Table 5** . Analysis of nitrogen and protein content of the ripe banana fruits

| Cultivar | Total nitrogen % (fresh weight) | | Protein % (fresh weight) | |
|---|---|---|---|---|
| | skin | pulp | skin | pulp |
| Kathali | 0·32 | 0·29 | 2·01 | 1·88 |
| Ethari | 0·39 | 0·39 | 2·45 | 2·49 |
| Kapal | 0·21 | 0·25 | 1·31 | 1·61 |
| Sampal mondan | 0·25 | 0·19 | 1·575 | 1·225 |

The cultivars Kathali and Kappal show greater variability with regard to number of fingers/bunch which is one of the important yield parameters. This may be genetic or due to environmental factors. Further investigation on these cultivars to identify their variability will be useful in selecting better high yielding varieties.

## References

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*Received for publication June 1991*