LEAF PRUNING TO INCREASE YIELD IN KOLIKUTTU BANANA

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ABSTRACT

Removal of 80 percent of leaf portions leaving only about 15—20 cm of leaf blade was done at different times after flowering. The fruit circumference and bunch weight per 1000 cm^3 of rhizome as well as rhizome density were recorded. Bunch weight and fruit circumference were increased and rhizome density decreased by leaf pruning at 4 weeks after flowering. The usefulness of full leaves up to 4 weeks after flowering and the utilization of stored food in the rhizome or increase in fruit size and yield thereafter were demonstrated.

INTRODUCTION

Bananas (*Musa* spp) are members of the complex Musaceae family. The kolikuttu banana belongs to the AAB group and is a dessert variety of repute in Sri Lanka. The kolikuttu is known as Kappel in Tamil and Silk in English (Simmonds, 1959). Because of its origin in South India, Kolikuttu desires higher solar radiation and high temperature for optimum growth and production. In Sri Lanka this variety is popular in the dry zone where the major rainfall season is from October to December during the North-East monsoon. Very little rain is experienced in the dry zone during the South-West monsoon from May to September. A little rainfall occurs during the inter-monsoonal periods. Hence, during most part of the year, the rainfed crop is subjected to water stress. This is most critical during the fruit enlargement phase of the crop.

Reduction in leaf area of bananas could reduce excessive transpiration and alleviate water stress considerably during dry periods. This water can be utilized by plant in terms of fruit growth.

This study was aimed to assess the effects of partial leaf removal on the fruit growth.

MATERIALS AND METHODS

The experiment was conducted at Beragama village situated in Hambantota district which is 6°N latitude, 81°E longitude and 30 m elevation under purely rainfed dry zone conditions. Two to three month old healthy suckers of kolikuttu were planted in March 1985, at a spacing of 2.4m. × 1.5m. Well decomposed cattle manure was applied at the rate of 5 kg in each planting hole at the time of planting. The clumps were managed as single plants, all other suckers being removed at emergence from the ground, to maintain uniformity. The plants were managed under uniform management conditions. All the plants in the experiment produced flowers in January 1986 and banana bunches were matured during the dry period which followed. The partial leaf pruning treatments were enforced at the necessary times after the female flowering took place. The time of leaf pruning were at 0, 2, 4 and 6 weeks after female flowering and no defoliation control was included. In the leaf pruning treatment 80 percent of the leaf area in each leaf was cut off leaving only 15—20 cm of the leaf blades. The flag leaf was not pruned.

A completely randomized design was adopted and each treatment was replicated 10 times. Due to the occurrence of panama disease at the time of flowering a few plants were uprooted. Bunches were harvested after 14 to 16 weeks of flowering with 15 cm of the peduncle when one fruit of the bunch ripened. The total weight of bunch, circumference of fruits of the bunch, the weight and volume of the parent rhizome were recorded after harvest of each bunch. Calculations were done, to obtain the weight of bunch per 1000 cm^3 volume of rhizome, to eliminate any errors due to different plant size not related to treatments. Rhizome density was derived by dividing the weight of rhizome by its volume.

RESULTS AND DISCUSSION

The results show that variability of bunch characters in different treatments such as fruit circumference, bunch weight and rhizome density were statistically significant (Tables 1, 2, 3).

The mean circumference of fruit, mean bunch weight per unit volume of rhizome and mean rhizome density for the different treatments are shown in Table 4.

Partial leaf pruning at flowering did not result in increased bunch weight or fruit circumference compared to no defoliation. This could be due to early reduction of leaf area of the plant which is detrimental to the plant in terms of fruit circumference and bunch weight (Table 4).

Partial leaf pruning at 2 week after flowering increased both fruit circumference and bunch weight (Table 4). This shows that presence of leaves up to 2 weeks increased both bunch weight and fruit circumference. So, it was of some benefit to the plant. Partial leaf removal at 4 weeks increased both fruit circumference, bunch weight and reduced the rhizome density significantly. This shows that keeping leaves attached for 2 more weeks increased both fruit circumference and bunch weight significantly over the control. Maximum benefit of leaves was obtained at this time. The reduced rhizome density at this time shows great utilization of the rhizome reserves. When partial leaf prunning was done at 6 weeks after flowering the fruit circumference was not significantly different to that of the unpruned control. This means that the period between the 4th and 6th week was detrimental to the increase of fruit circumference although the bunch weight was maintained. Negative results of having full leaves on bunch weight appear to be due to continued high transpiration in the dry zone when banana is grown under rainfed conditions. In considering both fruit circumference and bunch weight, it would be advisable to reduce leaf area by 80 per cent at 4 weeks after flowering.

CONCLUSION

This experiment clearly indicates that the fruit size and bunch weight of kolikuttu banana which flower into dry spell can be increased by removing 80 percent of each banana leaf on the plant at 4 weeks after flowering. It can also be concluded that removal of leaves should not be attempted earlier or later than 4 weeks after flowering as it reduces either fruit size or fruit weight or both.

REFERENCES

Simmonds, N. W. (1959). Bananas, Tropical Agriculture series Longmans, London., 466.

Table 1. Analysis of variance-fruit circumference (cm)

Source	*Degrees of freedom*	*Sum of squares*	*Mean sum of squares*	*F value*
Total	44	21.90		
Treatment	4	11.04	2.76	9.928**
Error	40	10.86	0.278	

$LSD_{0.05}$ = 0.502
$_{0.01}$ = 0.672
CV % = 4.70

Table 2. Analysis of variance - bunch weight (kg)

Source	*Degrees of freedom*	*Sum of squares*	*Mean sum of squares*	*F value*
Total	44	3.195		
Treatment	4	1.58	0.394	9.52**
Error	40	1.615	0.0414	

$LSD_{0.05}$ = 0.193
$_{0.01}$ = 0.259
CV % = 13.79

Table 3. Analysis of variance - rhizome density (g/cm^3)

Source	*Degrees of freedom*	*Sum of squares*	*Mean sum of squares*	*F value*
Total	44	6.984		
Treatment	4	6.790	1.698	8.84**
Error	40	0.192	0.0048	

$LSD_{0.05}$ = 0.066
$_{0.01}$ = 0.088
CV % = 7.44

Table 4. Fruit circumference, bunch weight per unit volume of rhizome and rhizome density at harvest, in plants subjected to partial leaf removal at different times.

Treatment Time of partial leaf removal after female flowering Weeks	*Mean fruit circumference (cm)*	*Mean Bunch weight (kg/1000cm³ of rhizome)*	*Mean rhizome density (g / cm³)*
0	10.60 ns	1.24 ns	1.11 ns
2	11.42 **	1.50 **	1.07 ns
4	11.65 **	1.69 **	0.94 **
6	10.42 ns	1.60 **	1.14 ns
Control	10.70	1.30	1.11
$LSD_{0.05}$	0.502	0.193	0.066
0.01	0.672	0.259	0.088
CV %	4.70	13.79	7.44

*Significant at 5% level **Significant at 1% level ns = not significant