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Report of the Intercropping Division-1979

Introduction

The long term intercropping projects at Sirikandura Estate, Dodanduwa and Walpita were carried to schedule during the year. Most of the intercrops planted at Lunuwila were very adversely affected due to the unprecedented drought that was experienced during the year. A large number of casualties was observed in the two year old coffee and cocoa plants and the one year old pepper plants. Banana was also very severely affected.

Due to the shortage of grazing land at Bandirippuwa Estate and Kirimetiyana Estate, a section of the animals in the cattle cross-breeding programme was handed over to the National Livestock Development Board. These will be maintained under coconut at Walahapitiya Estate, Nattandiya. The management and the breeding programmes will be the same as at Bandirippuwa. The data from this herd will be available to the Coconut Research Institute.

Walpita project

(*a*) **Coffee.** This trial studies the effect of three densities of planting coffee (8′ x 6′, 8′ x 8′ and 8′ x 10′ in two rows between two rows of palms) and three levels of fertilizer application (½, 1 and 1½ times the quantity applied to coffee in monoculture) on the yield of coffee and coconut. All coconut palms receive 10 lb/palm of CRI "C" per year applied at the base of each palm.

Some coffee plants in the trial flowered during the year. However they were stripped of all the fruits that were formed so as to prevent the plants becoming weak. Stem girth measurements taken during the year and the nut yield are presented in Table 1. This is the second year of the experiment. There are no significant effects on the nut yield due to the intercrop. Neither the density nor the level of fertilizer appears to have any significant effect on the early growth of coffee as measured by girth of the stem.

Table 1. *Mean girth of coffee stem and the nut yield of coconut due to intercropping coconut with coffee at different densities and levels of fertilizer application to coffee*

Level of fertilizer application	*Coffee planted at 8′x6′*		*Coffee planted at 8′x8′*		*Coffee planted at 8′x10′*	
	stem girth of coffee in cm	*nut yield of coconut per ha*	*stem girth of coffee in cm*	*nut yield of coconut per ha*	*stem girth of coffee in cm*	*nut yield of coconut per ha*
Half normal	6.9	6855	5.9	6632	6.2	6301
Normal	6.1	9435	7.6	6971	6.8	7096
1½ times normal	5.7	7019	6.6	6864	6.3	6129

(*b*) **Cocoa trial.** This trial compares the performance of four cocoa selections at three levels of fertilizer application grown under coconut. The cocoa is planted triangular in two rows between two rows of coconut. The rows are spaced 8ft apart and the plants in a row are also spaced at 8ft. The cocoa selections are (1) ICS 1, (2) NA 32, (3) Amilanado and (4) a local selection from Millawana Estate. The levels of fertilizer application are (1) half, (2) full and (3) one and a half times the full amount of fertilizer applied to cocoa in monoculture. In the first year of planting one third of this quantity was given per plant and in the second year two thirds that quantity. From the third year onwards the full amount will be given. Cocoa plants started flowering in the second year and a pod count was taken in September. The girth of the stem at ground level was also measured to get a measure of the vegetative vigour of the plants. These results are presented in Table 2. In all the introduced varieties the stem girth increased with increase in the lev l of fertilizer added. In the local variety a response was obtained at the second level over the first level while a depression was recorded at the highest level tested. Although all four varieties flowered in the second year, only varieties ICS 1, NA 32 and Millawana produced pods. The number of pods per plant of ICS 1 and NA 32 was higher than that of the local selection from Millawana. Of the two introduced varieties that produced pods, variety NA 32 was far superior to ICS 1.

Table 2. *Mean stem girth and pods per plant of different cocoa selections at three levels of fertilizer application*

Fertilizer level	*Half normal*		*Normal*		*1½ times normal*	
Variety	*stem girth (cm)*	*no. of pods per plant*	*stem girth (cm)*	*no. of pods per plant*	*stem girth (cm)*	*no. of pods per plant*
ICS 1	4.2	2	5.0	5	5.5	4
NA 32	5.2	5	5.6	7	5.7	5
Amilanado	3.9	nil	3.9	nil	4.1	nil
Millawana	4.6	3	4.8	1	4.0	nil

(*c*) **Crop mixing trial.** In this trial coffee, cocoa and pepper are grown together within the same coconut square. The pattern of mixing is as follows. There is one row of cocoa between two rows of coconut with the cocoa plants 10′ apart in the row. On either side of the cocoa row there is a row of coffee plants 6′ away from the cocoa row. Plants in the coffee row are 8 ft apart. Pepper is trained on to the coconut palms and also on to live support plants of *Gliricidia* planted at a density of two between two coconut palms in both directions. Thus the mixture consists of 260 pepper, 120 cocoa and 240 coffee plants per acre of coconut. This crop combination was planted in a block of land of 16 coconut squares. The preliminary observations made during the planting year show very satisfactory growth of all the crops. In the second year the pepper plants started flowering. The stem girth measurements of the cocoa and coffee were taken to obtain a measure of the vegetative growth. The pepper spikes that were formed were dried and made into black pepper. The mean yield of black pepper per vine was 112g and the mean stem girths of cocoa and coffee were 5.1 and 2.9 cm respectively.

(*d*) **Pineapple and pepper mixed cropping under coconut.** In this trial pineapple and pepper were established as a mixed plantation under coconut. Pepper was planted in two rows 8′x8′ in the coconut avenue on live *Gliricidia* supports and at the base of each coconut palm. The pineapple (kew variety) was planted in three rows eight ft apart in the avenue with 1.5 ft between plants in the row. A double row of pineapple three ft apart was also planted

along the coconut row between the palms. According to this method of planting there were about 500 pepper plants and 4500 pineapple plants per acre. The trial was planted in April and the pineapple flowered in November/December and a satisfactory yield is expected.

(*e*) **Cloves.** An acre block of land was intercropped with clove seedlings with a single clove seedling in the middle of each coconut square. The planting holes were 3'x3'x3' and were filled with two layers of coconut husks and the top soil up to six inches from ground level. The seedlings were shaded throughout with coconut fronds. The establishment was very satisfactory and continued to grow well during the wet season with a slight retardation in growth during the drought. The plants were watered during the dry period. Growth measurements were taken for the stem girth, height and spread of each plant and the mean values are given in Table 3. These values indicate that in spite of the drought the growth performance was very satisfactory.

Table 3. *Mean stem girth, plant height and spread of 2 year old clove plants growing under coconut at Walpita*

Character		*Value in cm*
Stem girth	...	4.23
Height	...	145.86
Spread	...	81.28

Sirikandura trial

This trial studies the effect of perennial crops such as coffee, cocoa, pepper, cinnamon and cloves on the yield of coconut in the wet zone. A treatment where crops such as pineapple, winged bean, manioc and capsicum can be rotated is also included for comparison together with a control treatment where no crops will be grown. All treatments are replicated three times in a randomised block design. All perennial crops were planted towards the end of 1977. Pepper, coffee and cocoa started flowering in 1979. However the fruits were not ready for harvesting during the same year. Pineapple was planted in May 1979 and started flowering in December. Coconut yields were recorded from 1977 and the mean yields for 1979 are presented in Table 4. It is too early to comment on the effect of these crops on coconut yields.

Table 4. *Mean nut yield/ha due to intercropping coconut with different perennial crops and crop rotation in the wet zone*

Treatment		*Nut yield per hectare*
Cloves	...	4781
Pepper	...	4510
Cocoa	...	4786
Coffee	...	6741
Cinnamon	...	5731
Crop rotation	...	4568
Control	...	4044

Lunuwila project

(*a*) **Coffee.** This trial compares the performances of 10 coffee selections at three levels of fertilizer application growing under a 35 year old stand of coconut. The 10 selections include 3 Arabicas and 7 Robustas. During the year under review a very severe drought was experienced and most plants wilted and shed their leaves. To measure any varietal difference in their resistance to drought the percentages of leaves shed were determined and they are presented in Table 5. The percentage of leaves shed in all the selections was well over 50 and there were no marked differences between selections or between the levels of fertilizer applied.

Table 5. *Mean percent leaves shed during a drought period by coffee selections grown under coconut at different levels of fertilizer application*

Coffee selections	*Half normal fertilizer*	*Normal fertilizer*	*1½ times normal fertilizer*
G.C.R.	63.3	75.0	71.7
I.M.Y.	66.7	70.0	67.5
C 36	64.2	69.2	80.0
K 7	64.7	58.3	68.3
C.C. 1	63.3	65.2	65.0
C 111	76.7	70.0	73.3
S 5	82.5	47.5	60.0
S 274	64.2	60.0	59.2
C 96	74.6	71.2	70.5
Bo 72	76.7	67.5	67.5

Growth measurements such as the girth of the stem and the number of primary branches were taken during the year. These are presented in Table 6.

Table 6. *Mean girth of stem (cm) and number of branches of 10 coffee selections planted under coconut at three levels of fertilizer application*

Coffee selections	*½ normal fertilizer*		*Normal fertilizer*		*1½ normal fertilizer*	
	Girth of stem(cm)	*No. of branches*	*Girth of stem(cm)*	*No. of branches*	*Girth of stem(cm)*	*No. of branches*
G.C.R.	9.3	34	8.7	29	8.2	35
I.M.Y.	8.6	20	8.6	27	7.4	40
C 36	8.3	33	8.4	29	8.4	29
K 7	7.5	5	5.1	14	5.0	14
C.C.1	8.5	27	7.9	25	8.9	28
C 111	8.0	33	6.9	23	8.3	29
S 5	5.7	16	8.7	26	5.9	16
S 274	7.8	22	8.0	26	8.3	25
C 96	6.9	27	7.2	29	6.5	26
Bo 72	5.7	19	7.0	21	6.1	15

The three Arabica selections K7, S5 and Bo 72 show a very low rate of growth compared to the Robusta selections. Selection K7 was better than the other two. Of the Robusta selections GCR, S274, C111, C36 and CC1 were promising. There was no marked response to the level of fertilizer application.

In addition to these, several other crops and crop combinations were planted under coconut at Lunuwila. Most of these crops were severely affected by the drought that prevailed during the year. All the clove plants succumbed to the moisture stress and the temperature. A large percentage of cocoa and pepper plants also perished.

Animal husbandry

The rotational cattle cross-breeding programme was continued during the year. The herd statistics at the end of the year were as follows.

Herd strength

		B/E	*R/E*	*K/E*	*Total*
Bulls	...	2	1	—	3
Cows	...	128	4	1	133
Bull calves	...	25	3	—	28
Heifer calves	...	68	2	21	91
Total	...	223	10	22	255

Statement of deaths and births

		B/E	*R/E*	*K/E*	*Total*
Births	...	89	6	13	108
Deaths	...	26	1	2	29

Sale of cow dung

Walpita project	...	160	cwt
Kotakanda	...	130	„
E/A	...	10	„
Staff	...	5	„
Total	...	487	„

Disposal statement of milk and animals

Milk (in pints)

	B/E	R/E	Total
Milk Board ...	121688	—	121688
Staff ...	23722½	1477½	25200
Turned into ghee ...	992	—	992
Fed to calves ...	1214	346	1560
Rejected by Milk Board	1184	—	1184
Added by Milk Board ...	24	—	24
Total ...	148824½	1823½	150648

Animals

During the year 267 animals were sold to the staff and the National Livestock Development Board.

D. E. F. FERDINANDEZ
Officer-in-Charge