EFFECT OF INTERCROPPING WITH TUBER CROPS IN ROOT (WILT) AFFECTED COCONUT GARDEN

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ABSTRACT

The effect of intercropping with tubers like tapioca (*Manihot esculenta* Crantz), elephant foot yam (*Amorphophallus companulatus* Blume) and yam (*Dioscorea alata* Linn.) on the yield and disease intensity of coconut palms (*Cocos nucifera* Linn.) in root (wilt) disease prevelent area was studied for three years from 1975. Yield of coconut showed an improvement in the plot intercropped with elephant foot yam, followed by yam to a lesser extent. In the plots with tapioca as intercrop and control, the intensity of root (wilt) disease was on the increase whereas in the plots intercropped with yam and elephant foot yam a slight decline in severity of the disease was observed. Yield of tuber was highest in the case of tapioca. Growing all the three intercrops was found profitable The cost benefit analysis showed that coconut+tapioca combination gave the highest net return per rupee invested.

INTRODUCTION

Economic gains of intercropping in coconut gardens were reported by Nair *et al.* (1974), based on the studies conducted at the Central Plantation Crops Research Institute, Kasaragod, a root (wilt) disease free area and established that intercropping in cqconut gardens had no adverse effect on the yield of palms, when both the main and the intercrop/s were adequately and separately manured. But the coconut gardens between Trichur District in the north and Trivandrum District in the south of Kerala State, covering an area of 2.5 lakh ha (about one third of the total area) are plagued with root (wilt)-a disease of uncertain etiology (Anon., 1976). In the above area, the net

return to the grower is comparatively low due to the low yield of coconut and also due to the additional expenditure incurred on plant protection operations to combat the leaf rot disease, found associated with root (wilt) disease. Improving the yield from root (wilt) affected coconut gardens is not immediately possible as there is no effective prophylactic or curative measure. In such a situation where the income from the main crop is dwindling, the agronomic strategy has to be oriented to evolve a suitable inter/mixed/multistoreyed cropping programme, which will ensure a reasonable income to the farmer from the land. Hence preliminary studies on intercropping with commonly cultivated tuber crops were undertaken at the Regional Station of CPCRI at Kayangulam during 1975 to 1977 mainly to find out the effect of the practice on the yield and disease intensity of coconut palms and also to assess the economics.

Material and Methods

In a 16 year old coconut stand, where the palms are spaced at 7.5 m × 7.5 m, tapioca, elephant foot yam and yam were raised in the interspaces continuously for 3 years from 1975. These crops were cultivated leaving an area of 2m radius around the base of coconut palms. They were grown under rainfed conditions adopting the recommended package of practices. Prior to planting intercrops in 1975 and after harvesting them in 1977, observations on the intensity of root (wilt) disease were recorded as per method devised by George and Radha (1973). The palms in the experimental area were classified into different disease intensity groups. The mean yield of palms in each of these different disease intensity groups in the intercropped and the control (no intercrop) plots during pre-experimental and experimental periods was worked out and compared.

The cost benefit analysis of the crop combinations was carried out on the basis of three-year average of cultivation charges and gross return.

In the case of tapioca where more than one variety was tried, the cost benefit analysis was worked out with reference to the highest yielder.

Results and Discussion

Yield of coconut

The mean yield and percentage variation in yield of palms during the experimental period as compared to pre-experimental period are given in Table 1. The estimated response in yield of palms due to intercropping with corrections duly incorporated for seasonal fluctuations is also given in the table.

A perusal of the overall response by palms under each intercrop revealed that, there was no reduction in yield of coconut palms due to intercropping. But there was variation in response by palms in different disease intensity groups. A general trend in yield increase of palms of the diseased group was seen in the intercropped area. A slight increase in the overall mean yield was noticed in the plot where elephant foot yam was cultivated (11.8%) followed by the plot where yam was cultivated (2.2%).

Disease intensity

In the control plot, during the course of three years, all the apparently healthy palms had developed disease symptoms (Table 2). The mean disease index (Fig. 1) for the palms in the control plot increased to 36.13 from 34.23 indicating an advancement in disease intensity. A similar trend from 32·1 to 37·25 though a little

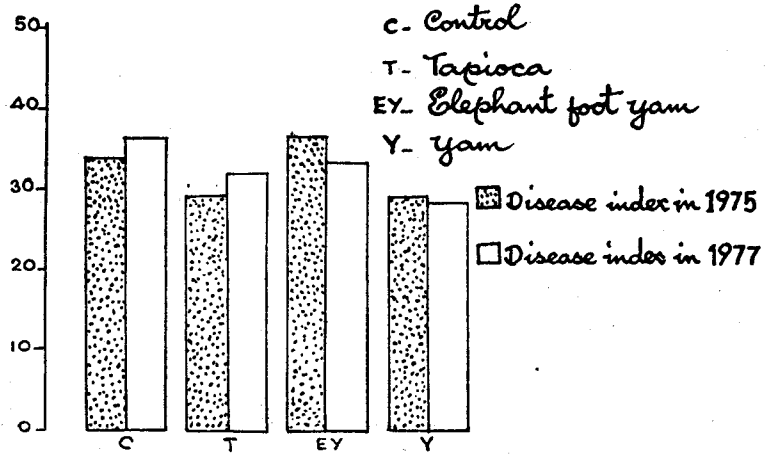

Fig. 1. Mean disease index pre and post experimental periods

Table 1. *Effect of intercropping in root (wilt) affected coconut gardens—yield of coconut palms*

Treatment	Disease Index	No. of nuts/tree		% increase/ decrease over pre-experimental period	Estimated net response %
		Pre-experimental period	Experimental period		
Control	0–10 (AH)	45.40	48.00	+ 5.72	
	11–25 (DE)	52.11	46.25	–11.24	
	26–51 (DM)	36.00	34.00	– 5.55	
	above 51 (DA)	30.33	26.25	–13.45	
	overall mean	40.96	38.62	– 5.76	
Tapioca	0–10	61.40	65.11	+ 6.04	+ 1.32
	11–25	52.83	50.80	– 3.84	+ 7.40
	26–51	48.47	44.09	– 9.03	– 4.48
	above 51	36.29	35.40	– 0.02	+13.43
	overall mean	49.75	48.85	– 1.80	+ 4.96
Elephant foot yam	0–10	55.00	76.94	+39.89	+34.17
	11–25	54.66	73.60	+34.65	+45.89
	26–51	52.00	45.20	–13.07	– 7.52
	above 51	48.33	39.00	–19.30	– 5.88
	overall mean	52.49	58.69	+11.81	+17.67
Yam	0–10	82.33	88.50	+ 7.49	+ 1.77
	11–25	59.09	63.94	+ 8.20	+19.44
	26–51	41.09	48.40	+17.79	+23.34
	above 51	45.53	32.39	–28.86	–15.41
	overall mean	57.01	58.31	+ 2.28	+ 8.04

AH—Apparently healthy; DE—Diseased early stage,; DM—Diseased middle stage. DA—Diseased advanced stage.