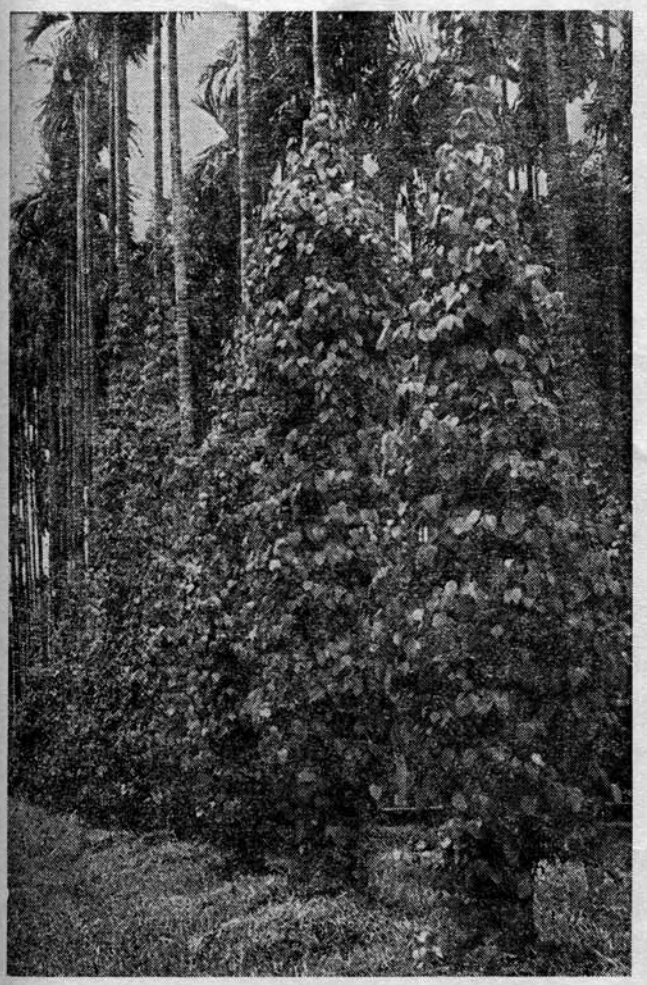

Pepper intercropped in areca gardens

INTERCROPPING WITH PEPPER

M. GOPALAKRISHNAN NAIR
Central Plantation Crops Research Institute, Regional Station, Vittal

ARECANUT is a crop cultivated by marginal and small farmers. Hence it becomes imperative to increase the returns per unit area of land to provide a reasonable income. Intercropping is one of the practices followed to meet this end. Fluctuation in market price of arecanut is considerably high. This again necessitates the growing of another cash crop to buffer the effect of low prices. Increasing the cropping intensity also facilitates proper utilisation of farm labour. Arecanut being mostly an irrigated crop, the growth of another crop will also improve the water use efficiency and increase the returns for the amount spent on irrigation. It shall be a boon to farmers in areas where the areca palm is affected by the elusive yellow leaf disease. They will be able to compensate the loss due to the disease by growing suitable intercrops like pepper and thus live with the disease.

There is considerable scope for practising intercropping in an arecanut garden. An areca garden with a spacing of 2.7 m × 2.7 m provides ample space and light for the growth of shade tolerant intercrops. Pepper is a remunerative cash crop ideal for intercropping in areca gardens. Pepper, being the understorey growth of humid tropical forests, is sufficiently shade-tolerant. Intercropping areca gardens with pepper is a practice followed by some of the farmers in the states of Kerala and Karnataka.

Pepper can be grown in the gardens once the palms reach a height of about 5 m. At this stage the trunk acts as a standard for pepper and penetration of sufficient light is also made possible. Pits of size 50 cm cube may be dug 35 cm away from the base on the northern side of the palms with the receipt of summer showers. These pits have to be filled with a mixture of compost (5 kg) and top soil and rooted pepper cuttings planted at the rate of 2 or 3 cuttings per pit. The vines have to be tied to the trunk of the palm as and when they grow. The height of the pepper vines may be restricted to 4 m to facilitate easy harvesting. Climbing the areca palms for purposes of harvesting and spraying has to be done with the help of a ladder to prevent damage to the vines.

Manuring

Adequate manuring has to be done to prevent competition between pepper and areca. Hence the recommended doses of fertilizers for the two crops have to be provided separately. The annual requirement of fertilizers for areca is 100 g N, 40 g P_2O_5 and 140 g K_2O in addition to 12 kg each of farmyard manure and green leaf. The recommendation for pepper is 100 g N, 40 g P_2O_5 and 140g K_2O over 10 kg of farmyard manure. The organics along with two-third the dose of inorganic fertilizers for the two crops may be applied in trenches 15 cm deep dug 75 cm away from the base of the palm. Lime at the rate of 1 kg may be applied in alternate

TABLE 1. COST OF CULTIVATION OF ONE HECTARE OF PEPPER IN AN ARECA GARDEN (NUMBER OF VINES-1372)

Year	Digging pits and planting		Cost of rooted cuttings		Tying vines		*Fertilizer application including cost	*Plant protection	Harvest		Total cost
	Mandays/cost at Rs 15/-day		Rs 0-25/cutting		Mandays	Cost			Mandays	Cost	(Rs)
			Number	Cost							
First	60	900	3900	975	10	150	1069	—	—	—	3094
Second	—	—	825	207	20	300	2138	1659	—	—	4304
Third	—	—	330	83	30	450	3239	3318	60	900	7990
Fourth	—	—	—	—	30	450	3239	3808	120	1800	9297
Fifth	—	—	—	—	20	300	3239	3808	120	1800	9147
Total	60	900	5055	1265	110	1650	12924	12593	300	4500	33832

Income from sale of 1300 kg pepper at Rs 12 per kg	Rs 15,600
Income from sale of planting material 20,000—3 node cuttings at Rs 0.10 per cutting	2,000
Total	Rs 17,600
Recurring expenditure	9,500
Net profit	Rs 8,100

*Elaborated in Table 2

years. The remaining one-third dose may be applied at a radius of 75 cm during February-March (if the plantation is irrigated) and lightly forked into the soil. The vines may be earthed up at the time of digging the interspace with the cessation of heavy rains.

A cover crop of *Calapagonium mucunoides* can be raised with the onset of summer showers. During summer the crop dries off leaving a thick mulch which will do away with the need for digging the interspace. During subsequent years a self-sown crop is produced from the seeds shed by the previous year's crop. This will help in conserving the soil and improve the organic matter status of the soil. Ring method of irrigation may be preferred to the basin irrigation which is in vogue as this will facilitate earthing up of the vine bases. Adequate soil conservation measures and drainage have to be provided.

At the time of spraying against Mahali disease a spray of Bordeaux mixture is recommended for pepper also. The basal 1 m portion of the vine has to be painted with Bordeaux paste as a precautionary measure against the foot rot disease of pepper. The soil around the vines may be drenched with 5 litres of 1 per cent Bordeaux mixture of 0.1 per cent Ceresan wet. An insecticide spray has to be given if there is incidence of pollu beetle. Dimethoate 0.06 per cent and Dithane Z-78 (0.2 per cent) against fungal pollu. If nematode infection is noticed phorate or carbofuran at 1 g ai/vine may be applied twice a year in May-June and October-November.

Pepper vines usually flower during May-June with the commencement of the monsoon. Harvesting season is from January to March in the hills and slightly early

TABLE 2. COST OF MANURING AND PLANT PROTECTION OPERATIONS

Manuring			
Dose for 3-year old vines: 100g N, 40g P_2O_5 and 140g K_2O Farm yard manure 10 kg/vine			
			Rs
Farm yard manure	13 tonnes at Rs 100/ton		1,300
Urea at Rs 2.50/kg	286 kg		715
Superphosphate at Rs 1-04/kg	291 kg		303
Muriate of potash at Rs 1-36/kg	310 kg		421
Application charges	(20% of cost)		500
			3,239
Plant protection			
Two sprays of Bordeaux mixture at 3 litres/vine	Copper sulphate at Rs 18/kg	78 kg	1,404
	Lime	78 kg	60
	Spraying charge Rs 0-20/vine		520
Drenching Bordeaux-mixture 5 litres/vine	Copper sulphate		1,170
	Lime		50
	Application charges		180
Painting Bordeaux paste 1 litre for 10 vines	Copper sulphate	13 kg	234
	Lime	13 kg	10
	Application charges		180
	Total		3,808
One spray of insecticide against pollu beetle (0.06% dimethoate at 3 litres/vine	Rogor 13.5 litres at Rs 90/- litre		1,200
	Spraying at Rs 0-20/vine		260
			1,460
Nematicide-two applications per year	Furadan	86 kg	1,603
Carbofuran at 1 g ai/vine	Application charges		300
			1,903

in the plains. Harvesting is done by plucking the spikes by hand when one or two berries on the spike turn red. It may be done in two or three rounds as all the spikes may not reach maturity at the same time.

Berries are separated from the spikes by rubbing between the hands or trampling them under feet. The berries are to be dried in the sun for 7-10 days until the outer rind turns black in colour and shrunken in size. The moisture content of the berries should be below 11 per cent for safe storage. Extraneous matter, light berries and pin heads may be removed by winnowing. Grading of pepper can be done with the help of sieves of different meshes to obtain berries of required size. Dipping the berries, collected in a basket, in boiling water for one minute facilitates quicker drying, the berries get a shining black colour and reduce the microbial load in the product.

White pepper fetches 40 per cent more price than that of black pepper in the international market. It is prepared by harvesting spikes with fully ripe berries. The berries are filled in gunny bags and steeped under flowing water for about 7 days. Subsequently the outer rind of the berries is removed by rubbing with hands in a bucket of water. Subsequently it is washed in clean water, dried for 3 or 4 days, cleaned by winnowing and polished by rubbing with a cloth. The loss in weight may be about 8 per cent compared to black pepper. The other commercial products of pepper are canned green pepper, dehydrated green pepper, pepper oil and pepper oleoresin which usually enter the export market. White pepper is a product which can be prepared without any equipment or complicated technology.

One hectare of areca garden with a spacing of 2.7 m×2.7 m will accommodate about 1300 pepper vines. With good management practices a pepper vine should produce a minimum of 1 kg black pepper in the fourth year. Taking the cost per kg of pepper to be Rs 12 the additional income comes to Rs 15,500 per hectare. The farmer will get an income of Rs 2,000 by sale of planting material making the total income Rs 17,500. The recurring expenditure for the maintenance of an intercrop of pepper has been worked out as Rs 9,500. This enables the farmer to earn a net profit of Rs 8,000 by intercropping his areca garden with pepper. The yield will be doubled by the seventh year. The sale of products shall increase his net returns.

An experiment was laid out at the CPCRI, Regional Station, Vittal in 1977 with four varieties of pepper namely 'Malligesara','Uddakare','Panniyur-1' and 'Karimunda' as inter crop in an areca garden planted in 1959 under different spacings. The experiment has so far shown the superiority of the latter two varieties for intercropping. The yield of arecanut has also not been affected by the growth of pepper. The green berry yield of the four varieties under spacing of 2.7m×2.7m during the fourth year is as follows: Karimunda 4582 g, Panniyur-1 3227 g, Malligesara 1652 g and Uddakare 200 g.