Arrowroot (*Maranta arundinacea* L.)
A Potential Intercrop in Coconut Garden

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Introduction

The strategy for intensive multiple cropping in coconut garden is to have parallel combinations of crops in such a way that other crops of less duration are planted in the interspaces without altering the planting pattern or intensity of the coconut. Studies conducted at the Central Plantation Crops Research Institute and elsewhere have proved the suitability and economic viability of growing various inter and mixed crops in coconut garden.

The arrowroot crop is erect perennial herb belonging to the family Marantaceae. It is indigenous to tropical America and widely distributed throughout the tropical countries like India, Sri Lanka, Indonesia, Philippines, Australia and West Indies. The economic part is rhizome, which is used for the production of starch. The starch is valued as a food especially for infants, invalids and convalescents. It is used in the preparation of biscuits, cakes, puddings and jellies. It possesses demulcent properties and given in bowel complaints. It is employed as a suspending agent in the preparation of barium meals and the starch is preferred as base material for making tablets, since it produces rapid disintegration. Starch is also used as a base for face powders and in the preparation of special glues. Keeping in view of the importance of arrowroot crop, a field investigation was carried out with the objective to study the performance of arrowroot in coconut garden and in open condition.

Materials and Methods

An observatory trial was undertaken to study the performance of arrowroot in a sandy loam soil with 30 year old coconut garden, having the spacing of 7.5 m apart and in open space. In both the situations, the crop was established by adopting the package of 30 x 30 cm spacing, FYM : 20 tonnes per hectare and NPK : 75:50:50 kg per hectare. The FYM was applied 21 days before planting arrowroot. The raised beds of convenient size were prepared and rhizomes of 20-25 g weight were planted and mulched with green leaves. Full dose of P and 50 per cent of K was given as basal dose during planting. The 50 per cent of N was given during 60 days after planting and the remaining 50 percent N and the 50 percent K were given during 120 days after planting by opening a small furrow in between the rows in the form of urea, mussooriephos and muriate of potash. The growth characters like number of tillers, number of leaves and leaf area were recorded from representative plants. At harvest, number of rhizomes, length of rhizomes, girth of rhizomes and fresh weight of rhizomes were recorded. Chlorophyll and carotenoid estimations were carried out using the standard procedure (Arnon. 1949) Starch content was estimated by Anthrone reagent method (Sadasivam and Manikam, 1992). The sample was treated with 80 per cent alcohol to remove sugars and the starch was extracted with perchloric acid. Then the starch was hydrolysed to glucose and dehydrated to hydroxymethyl furfurol in hot acidic medium, which, with anthrone forms a green colour product. The starch content was expresed on dry weight basis. The crude protein content was calculated by multiplying the nitrogen percentage of rhizome by 6.25 factor (Jackson, 1973).

Results and Discussion

Growth, yield components and yield

Growth and yield components were higher when the crop was grown as intercrop in coconut compared to open space. Better growth of the crop as reflected in higher dry matter, more number of tillers and leaves (*Table1*) indicates its adaptability to partial

Table 1. Comparative performance of arrowroot under open space and as intercrop in coconut garden

	Plant height (cm) (180 DAP)	No. of tillers per plant (180 DAP)	No. of leaves per plant (180 DAP)	leaf area (cm^2 per plant) (180 DAP)	Chl.a (mg per g fresh leaf) (175 DAP)	Chl.b (mg per g fresh leaf) (175 DAP)	Carotenoid (mg per g fresh leaf) (175 DAP)
Open ;	70.3	4.4	40.2	2823.3	1.210	0.731	0.061
intercrop	99.7	7.1	64.3	6453.2	1.983	0.973	0.098

*DAP - Days after planting, *Pooled data; Data not statistically analysed*

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Table 2. Comparative performance of arrowroot under open space and as intercrop in coconut garden

	Total DMP (g per plant) (At harvest)	No. of rhizomes per plant	Fresh rhizome yield (t per ha)	Starch (%)	Crude protein (%)
Open space	90.2	5.1	11.4	67.2	4.3
Intercrop	151.4	10.6	17.3	73.2	5.3

DMP - Dry matter producton, Data not statistically analysed

shade condition. Further the chlorophyll 'a', 'b' and carotenoid contents were higher when grown in coconut garden. Shade grown plants of cocoyam had greater foliage, dry weight, top: corm ratio and greater corm dry weight, LAI, CGR, NAR and greater chlorophyll compared to sun grown plants (Valenzuela, 1990).

Fresh rhizome yield was also higher when grown in coconut garden (17.3 t/ha) compared to open space (11.4 t/ha). The per cent increase was 34.1 per cent in intercrop compared to open space crop. This is mainly because of better growth and yield components. Similar increase in yield of arrowroot when grown as an intercrop in areca garden has been reported by Muralidharan (1990). In turmeric also higher growth and yield has been reported when grown as an intercrop in areca garden (Muralidharan, 1980), and in coconut garden (Satheesan, 1984 and Latha *et al.* 1995).

Quality Characters

Starch and crude protein contents were higher in intercropped crop (73.2 and 5.3%, respectively) compared to open space crop (61.2 and 4.3%, respectively). This is attributed to the better growth and yield components in intercrop. Satheesan and Ramadasan (1988) reported the higher build up of starch in the rhizomes when grown as intercrop compared to open space grown crop in turmeric cultivars.

Conclusion

From this study it can be concluded that arrowroot can be grown as intercrop in coconut garden for additional income.

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* *Originals not seen*