

Pruning and Canopy Management in Cocoa

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Introduction

Cocoa plants are cultivated under the shade of arecanut and coconut plantations. Canopy management in cocoa is very important for regulating canopy size and shape. In order to study the effect of different pruning regimes for canopy size, two trials viz., one with seedling progenies and another with grafts were undertaken. This folder gives an account of the results of these experiments for maximizing productivity in areca-cocoa gardens.

Formation pruning

This is done in young plants, mainly to adjust height of jorquette. The main stem may be kept to 1-2 m height before allowing the first jorquette (Fig. 1). About 3-4 fan branches may be allowed at this point, which will facilitate proper cultural operations. When budded-clonal planting material is used, it is advisable to keep 2-3 strong upright stems for good pod yields.

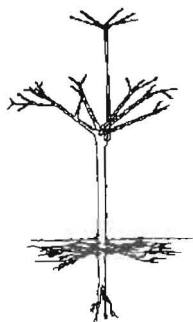


Fig.1. Plant structure of cocoa

Pruning of seedling material

In the first trial with seedlings, there were three spacing and three canopy size treatment viz., small P1(10m³), medium P2(15m³) and large P3(20m³) in a split plot design. The spacing treatments were S1 (2.7x2.7m), S2 (2.7x5.4m) and S3 (5.4x5.4m). The results showed that there was significant difference in growth and canopy architecture with reference to treatment. Light interception varied among different treatments ranging from 88 to 92 per cent (Fig. 2). In the seedling trial, the dry bean yield showed significant variations, highest yield being obtained in S1P3 and S2P3 treatment (2.7 x 2.7m; 2.7 x 5.4m spacing and large canopy; Fig. 3). The shape of the canopy should be umbrella shaped with a canopy spread of 3.8 - 4.0m for ideal regime (Fig. 4). At the level S2P3 of canopy architecture, the land equivalent ratio (LER) showed maximum values (Table 1). Pruning of canopy is necessary for maintenance of optimum leaf area index in cocoa. Thus pruning is absolutely necessary for productivity.

Pruning trial of cocoa

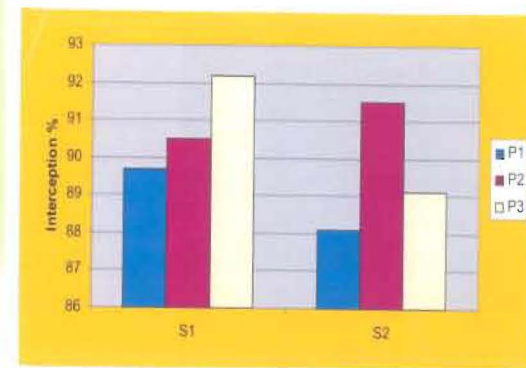


Fig.2. Light transmission in cocoa canopy

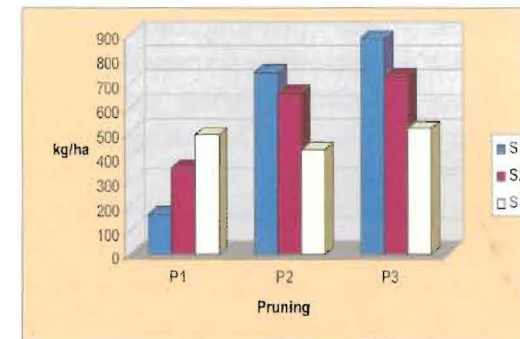


Fig.3. Dry bean yield (kg/ha) in seedling progeny



Fig.4. Ideal pruning of cocoa seedling progeny

Table 1. LER in mixed crops

Treatment	P1	P2	P3	Mean
S1	1.13	1.34	1.68	1.38
S2	1.34	1.38	1.74	1.48
S3	0.82	1.53	1.67	1.34
Mean	1.09	1.42	1.70	

Pruning of graft material

The second trial with grafts was laid out in arecanut garden with two spacing of cocoa (2.7 x 2.7m and 2.7 x 5.4m) and three canopy sizes (small, medium and large). In recent years emphasis is being given to planting of graft materials. This is obtained from soft wood grafting method using high yielding cocoa clones. For pruning of graft plants after first year of planting, primary pruning should be done to obtain a supporting framework of one or more upward growing main stems during first year. The drooping fan branches may be later removed. Secondary pruning has to be done for bringing desired canopy shape. Canopy should be maintained in umbrella-shaped form with about 3.8-4.5m spread, 2.7- 3.2m height with a canopy area of 15-20m³ (Figs. 5, 6).

The growth and canopy characters viz., stem girth, canopy spread showed significant variations with P3 (large, 20 m³) canopy recording highest values. The canopy area and leaf area were also higher in P3 treatments. Higher bean yield was recorded in S1P3 and S2P3 treatments (Fig.7).



A plant of S2P3 treatment showing pods



Fig. 5. Pruning method for graft plant



Fig. 6. Ideally pruned graft plant

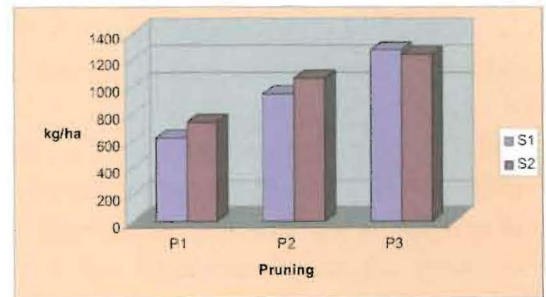


Fig.7. Dry bean yield (kg/ha) in grafts

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