HORTICULTURE NOTE NO. 22

COCOA PRUNING

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ABSTRACT

Pruning is a management practice used by plantation tree-crop farmers through out the tropics. It is done to prevent a crop such as a cocoa tree growing very tall, by developing second and third storeys from the original jourquette of a young cocoa tree. Pruning allows a cocoa tree to attain a constant height throughout its productive period, helps in preventing the spread of pests and diseases, and allow the use of proper management practices.

INTRODUCTION

Pruning is one of the most controversial of all work performed on cocoa. Farmers have their own ways of pruning which they think is best, so one could argue for ever on the merits of each system. To avoid this, let us look at what we wish to achieve when we prune cocoa. Pruning is one of the most important operations, and it can affect the yield of cocoa for many months - even years after the pruning. It is imperative that all care be taken when pruning. There are three types of cocoa trees that have to be pruned.

Hybrids
Trinitarios
Clones (Vegetatively propagated cocoa)
(This paper will deal only with *HYBRID* and *TRINITARIOS*).

PRUNING HYBRIDS AND TRINITARIOS

1. Formation pruning
2. Chupon or Water Shooting Pruning
3. Sanitary Pruning
4. Structural Pruning

PRUNING TOOLS

To prune cocoa properly you MUST have the proper tools. (See Figure 1) At all times these MUST be kept sharp.

N.B. A bushknife should never be used to prune cocoa.

PRUNING HYBRIDS AND TRINITARIOS

1. FORMATION PRUNING

Young cocoa, if left to its own devices, will jorquette at about 1.5 meters. It will then produce chupons that will grow past the original jorquette to form second and third storeys. If this is allowed to happen, the cocoa trees will become far too tall to manage correctly. To prevent this, the tree is pruned along the following lines to give the desired shape:-

1.1. Remove Double Headers and Side Shoots

If a cocoa seedling is damaged mechanically and the growing point is destroyed, the seedling will throw up

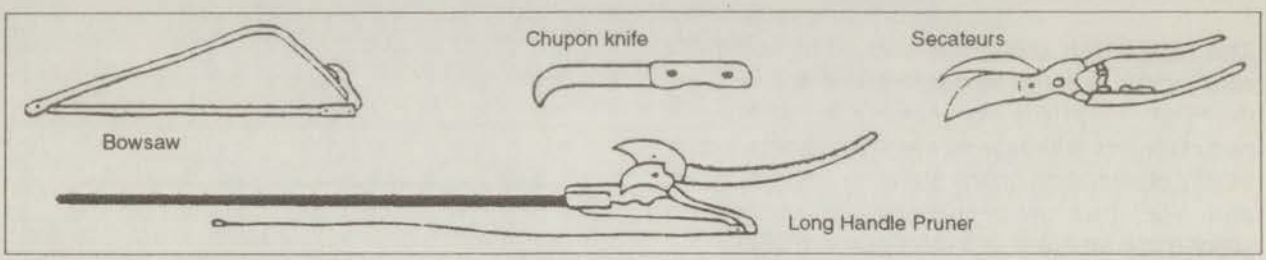

Figure 1. Pruning tools

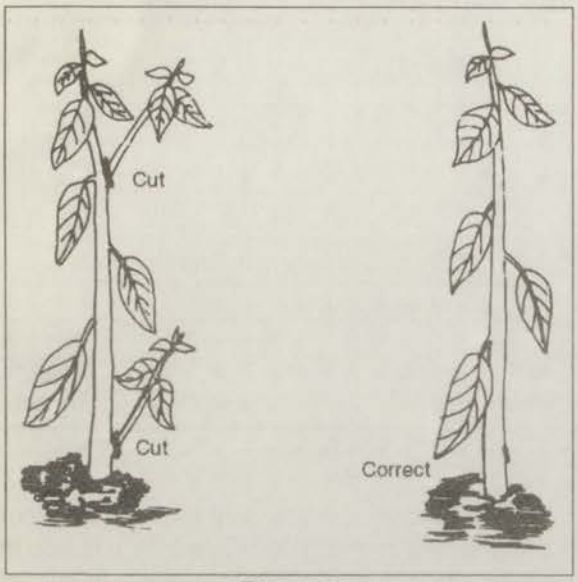

Figure 2..

a number of new shoots to replace the lost growing point. (See Figure 2.) This damage, often seen in cocoa, may be caused by falling nuts and fronds from coconuts, wind damage, hand-slashing, insect damage, or over-zealous use of herbicides. If left unpruned, the young seedling will be retarded - first from the mechanical damage, and then from the seedling trying to grow multiple stems. It is most important that these plants be pruned back to a single stem as soon as possible, to divert all energy into one stem. The chupon team doing the monthly rounds on the mature cocoa tree should also do monthly double - header and chupon rounds in new plantings.

1.2. Prune Trees to a Manageable Height

Cocoa seedlings, if mechanically damaged,

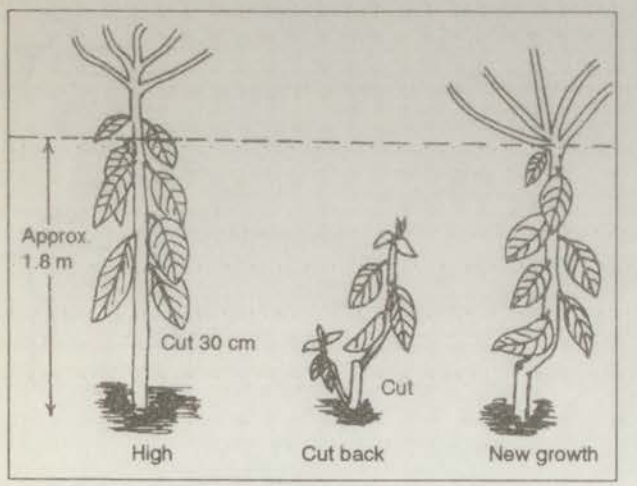

Figure 3.

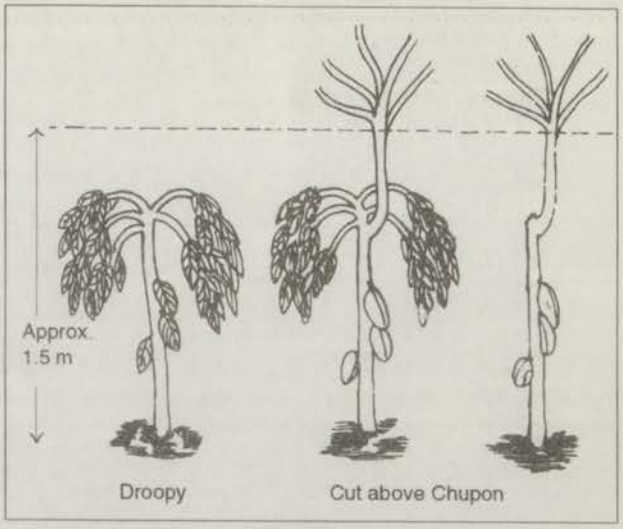

Figure 4.

overshaded, or genetically inclined, will often jorquette at a height that is too high for normal management practices. If cocoa seedlings jorquette above 1.8 metres, they should be stumped back at an angle to about 30 centimeters, and two new basal chupons should be allowed to grow. After about three months, the weaker of the two should be cut off and the stronger new shoot allowed to form a new tree. (See Figure 3). If the tree once again jorquettes too high, leave it, as nothing else can be done.

Other seedlings, especially the Kee 22 seedlings have a low jorquette and drooping habit which impedes access to the cocoa. These trees can be encouraged to jorquette higher by allowing an apical chupon to grow, and ramify at a higher point by allowing an apical chupon to grow up through the existing tree. Once it has ramified at the correct height, remove the old canopy. (See Figure 4).

1.3. Allow 5 Main Branches to Surround the Main Trunk

The natural ramification of branches from the trunk is five, so there is no need to change this. When pruning, aim for five strong branches evenly spaced around the trunk. When the majority of trees have formed a jorquette at about 9 months, you need to have a round of five-branches pruning. Pruners should carry a 60 centimeter stick and cut out all branches within this area. (See Figure 5.). If there are not enough branches to get five, extra branches can be created by allowing a main branch to divide into two. (See Figure 6.) Five-branch pruning rounds should be done every 4 to 6 weeks as part of a normal chupon round. They should not be stopped once the

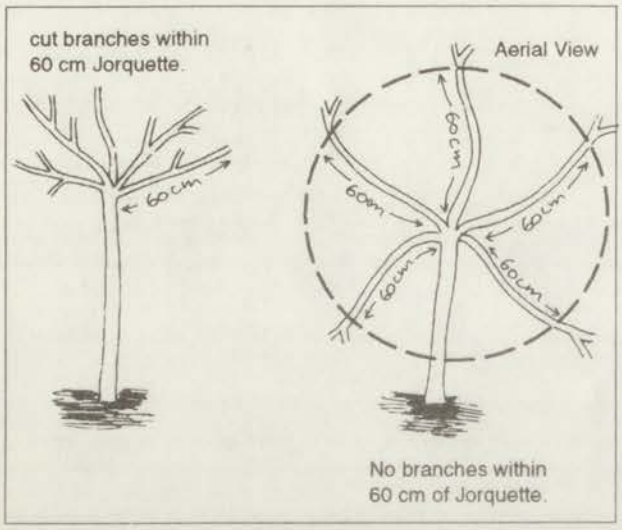

Figure 5.

tree has matured. The reason for this is that cocoa trees are constantly changing from mechanical damage, or bad management. It is, therefore, a constant job to keep trees with five strong lateral branches.

2. CHUPON AND WATER SHOOT PRUNING

If allowed to grow, chupons will grow up through the

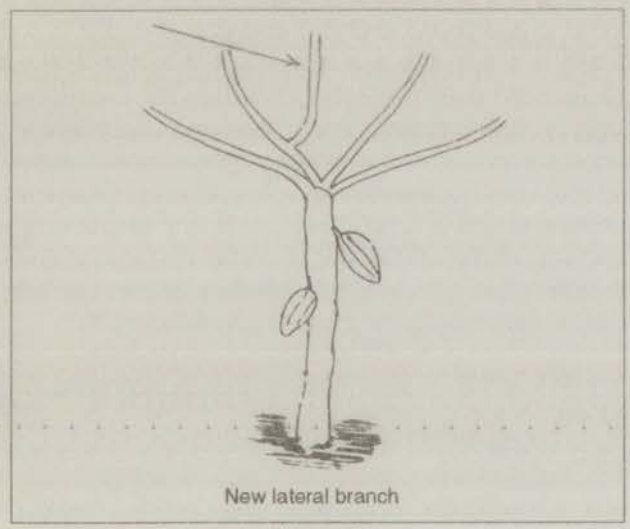

Figure 6.

present canopy and form a second storey. All chupons should be removed from the tree when they are soft and have not taken any energy out of the tree. To achieve this, chupons should be pruned off every 4 to 6 weeks. If chupons are pruned regularly, all that will be required for their removal is a sharp knife - NOT A BUSH KNIFE. It is important that the knife be kept sharp and that the chupon be cut as close to the trunk as possible. If "hat pegs" or cushions are left, the

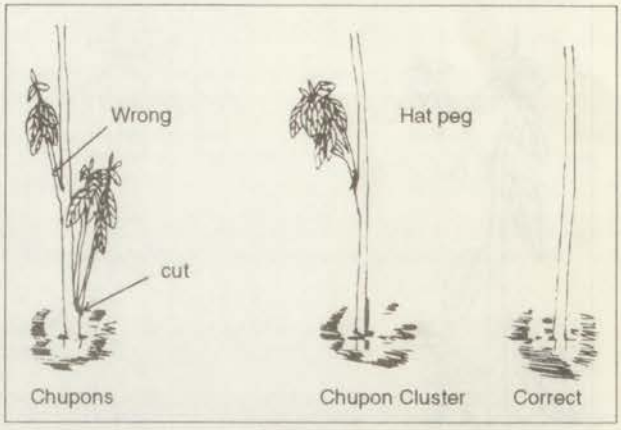

Figure 7.

chupons will regrow in thick clusters, requiring more work on the next round. (See Figure 7.) It is also the job of the chupon pruners to remove any coconut fronds, rubbish, etc from the tree. Chupon pruners should carry a pair of sharpe secateurs to cut off any diseased or damaged branches as a normal part of their round. They should carry a 60 centimeter stick, and cut out all branches within a 60 centimeter-radius of the jorquette, while all the time ensuring that the tree has five strong branches surrounding the trunk. (i.e. If a tree has only 4 branches, a young fan branch should be left to grow as a replacement for the lost branch.) Pruners should be taught the difference between chupons and fan branches to make sure the right ones are being cut off or retained. (See Figure 8.)

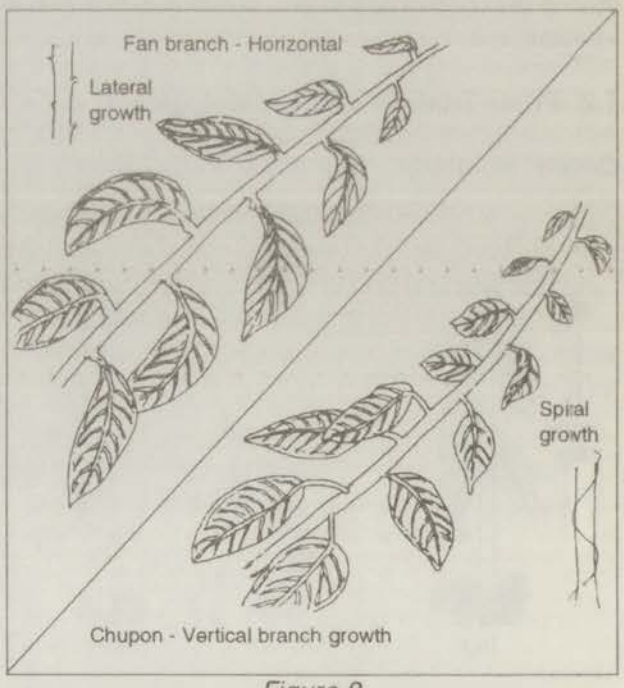

Figure 8.

3. SANITARY PRUNING

Sanitary pruning is pruning to remove diseased or damaged wood to help control the disease. The main

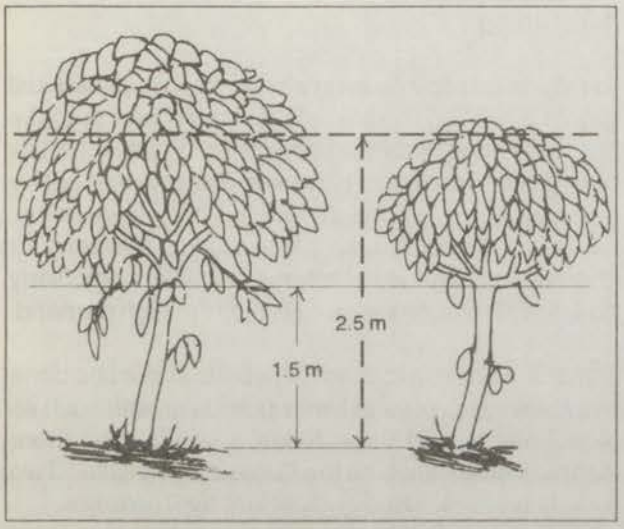

Figure 9.

diseases in PNG that require sanitary pruning are Pink Disease and Vascular Streak Dieback. (See CCRI Information Bulletin and Plant Pathology Notes). Sanitary pruning is combined with the normal structural pruning. (i.e. When pruning a tree, the sanitary pruning is done first, the tree is then evaluated,) and the structural pruning done to compensate for any loss of branches and foliage. However, in some cases where there are bad outbreaks of disease, special sanitary pruning rounds will be necessary, particularly with "Pink Disease" *(Corticium salmonicolor)* in young cocoa in the wetter areas of the country.

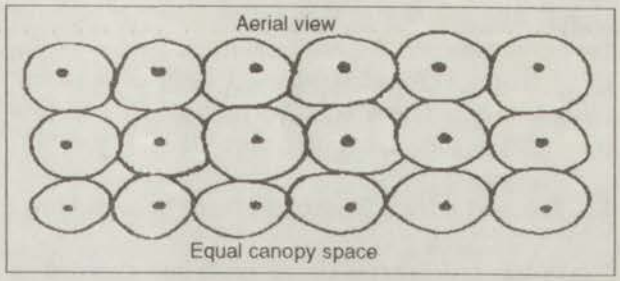

Figure 10.

4. STRUCTURAL PRUNING

4.1. Remove Diseased or Damaged Branches

When you first start to prune a cocoa tree, the first task is to remove any diseased or damaged branches. Once this is done, the tree can be looked at as a whole, and decisions made on how it can best be pruned to make the best tree from what is left.

4.2 Control Height of Trees

If cocoa was allowed to grow to its natural height, harvesting and disease control would be impossible. Sunlight would be restricted and air movement impeded. To allow all activities to be done with ease, the cocoa must be pruned to a height that is accessible to harvesters, fungicide spray teams and sanitation rounds. It is recommended that cocoa be kept to a height of about 3.5 meters. To do this, major branches should be allowed to grow up to 3.5 meters. Hence, major branches extending above 3.5 meter-mark. (i.e. those thicker than 40 millimeters.) Smaller branches can be left as they will curve down with gravity, if they don't they can be pruned off next

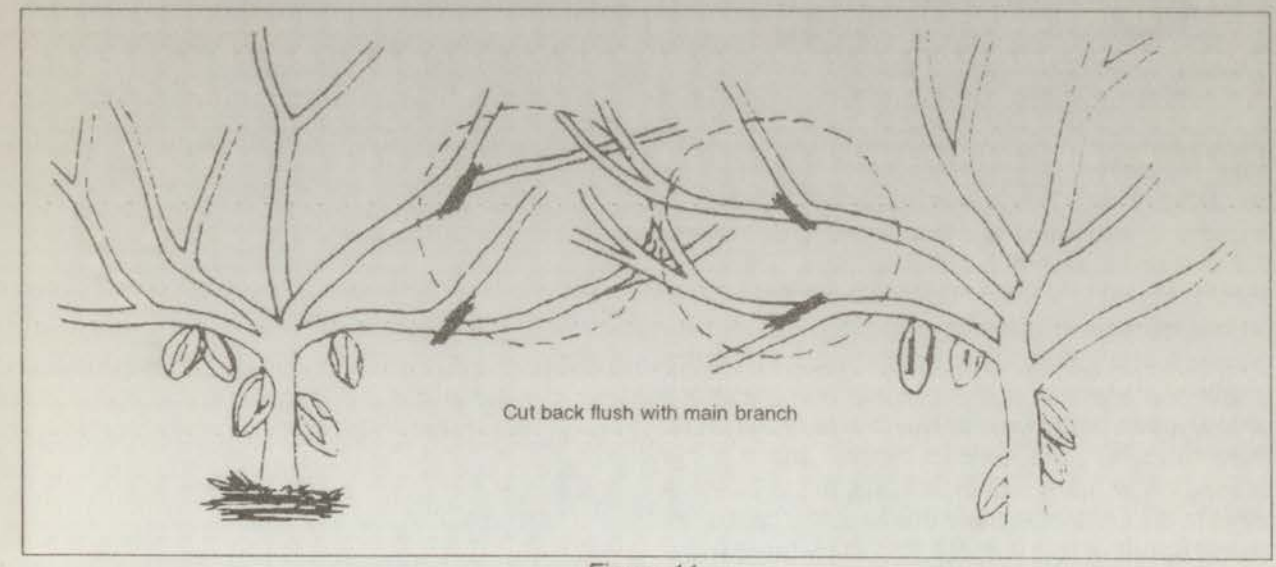

Figure 11.

round. All parts of the trees are then within range of the harvesters' hooks and extended lances of the spray teams. To allow easy access of workers, canopies should be lifted to 1.2 metres. This means cutting off any low-lying branches. (See Figure 9.)

4.2 Prevent lateral Branches from Interlocking

Cocoa trees, if unpruned, will grow into each other laterally, forming a thick mat of foliage, which will impede light and air access. As well, the more vegetatively vigorous trees will dominate the less vigorous, which are usually the best producers as they are putting their energy into pods rather than vegetative growth. (See Figure 10.)

All lateral growth should be cut off when it touches the other tree. This should be done midway between the trees so that each tree has the same area to grow in, and the less vigorous trees are not overgrown by the vigorous ones. (See Figure 11). Nodal branches are cut to the nearest node.

4.4 Canopy Allowing Air and Sunlight Penetration

Once the height and tipping are complete, the canopy

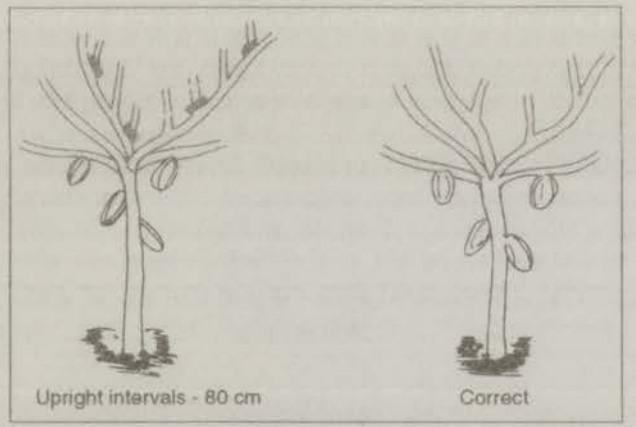

Figure 12.

must be looked at with the aim of allowing free circulation of air. This is most important in reducing humidity, which in turn helps to control fungal diseases. Penetration of sunlight is also important. Canopies should intercept the maximum amount of sunlight for photosynthesis, while leaving enough foliage to protect the tree from sunburn. The practice of cutting out the middle of the tree must be avoided. With the vigour of the hybrids, particularly with high density plantings, there tends to be a "witch's broom" effect in the canopy. After many pruning rounds, the trees strive to get to the sunlight. Where this happens, branches should be pruned out to about 30 centimeter intervals evenly along the main branches. (See Figure 12.)

Once again, this leaves branches evenly spaced to allow air and sunlight to penetrate. When completed, there should be a dappled sunlight effect on the ground. Care must be taken not to cut out too much material.

4.5 Timing

Ideally, in-canopy pruning should be completed just before flowering to stimulate flowering and to make sure the young pods start off in an environment of low humidity and sunlight. However, there should not be any major pruning (height and tip) before flowering. No pruning should take place during flowering or cherrele set. This is not always possible, particularly on large plantations where labour is in high demand.

Structural pruning rounds for hybrids should be done twice yearly in areas of less vigorous growth such as New Ireland, and three times a year in the more vigorous areas such as the Gazelle Peninsula. Two rounds a year is usually sufficient for Trinitarios.

5. CONCLUSION

Pruning is one of the most important and expensive cocoa management tasks, so it is vital that it is done carefully and correctly. Bad pruning can ruin a tree for life, or at the least affects production for many months.

Remember the main aims of pruning:-

TO CREATE TREES OF THE CORRECT HEIGHT WITH AN OPEN CANOPY THAT ALLOWS AIR AND SUNLIGHT TO PENETRATE.