

# Population control in banana plantations.

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CONTROLE DE LA POPULATION DANS LES BANANERAIES

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RESUME - Description d'un système de comptage précis des populations des bananeraies. Il a été mis au point par les auteurs dans une opération bananière d'exportation au Honduras en 1954. Ils discutent de l'application de ces comptages au niveau pratique des fermes.

In the literature dealing with banana production there are many references to planting distances and to pruning, the two basic techniques used in population control. Nevertheless, the volume of literature available on the subject of population control is dwarfed by the magnitude of the concern of the plantation manager about the practical aspects of this subject.

Even to the trained eye of the farm manager, banana populations tend to appear high during the three-month period prior to the annual peak in fruit production and low prior to a trough in production. The principal factor involved is the number of mature banana plants per hectare but there are other contributing factors such as height and diameter of plants, number of standing leaves per plant, size of leaves, and the number and size of followers that contribute to the impression of stand density.

Farm managers in most areas today are concerned with population because of its effect on production per hectare, hand class and finger length. In general, there is a positive correlation between plants per hectare and stems produced and above a certain population a negative correlation between plants per hectare and stem size and plants per hectare and finger length. Large-fingered fruit from large stems

brings premium prices in the American market and at the same time the per pound cost of harvesting and processing large stems is lower especially when the labourers are paid on a piece rate basis. Experience has proven that overcrowded plantations do not bear large stems with long, well developed fingers and farm managers must, therefore, select that population which will produce the maximum amount of fruit of the size and quality that will bring a premium price on the market.

If the plantation is overcrowded at the time of peak «shooting» (1), the stems will produce short-fingered fruit at maturity and therefore a lower price on the market. The stem weight and the box-to-stem (2) ratio will be correspondingly low for a given hand class. In addition, crowding may contribute to the Sigatoka control problem by making good spray coverage impractical.

Prior to the peak harvest there is a period of approximately three months during which a large number of plants have reached their maximum size and carry developing stems of fruit. At the same time, these plants are accompanied by well advanced followers which will bear the next crop. After the peak harvest when the number of bearing

(1) initial appearance of the fruiting bud.

(2) the average number of 40 pound boxes of export fruit shipped from each stem harvested.

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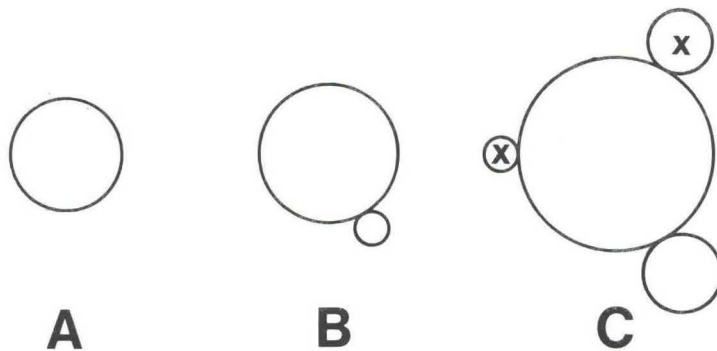


FIGURE 1 \* EXAMPLES OF CONFIGURATIONS THAT WOULD BE COUNTED AS ONE PRODUCTION UNIT.

- A. A plant that has yet to produce a follower.
- B. A plant with a follower that will be left for production.
- C. A plant with more than one follower of which all but one will be removed in the next pruning cycle.

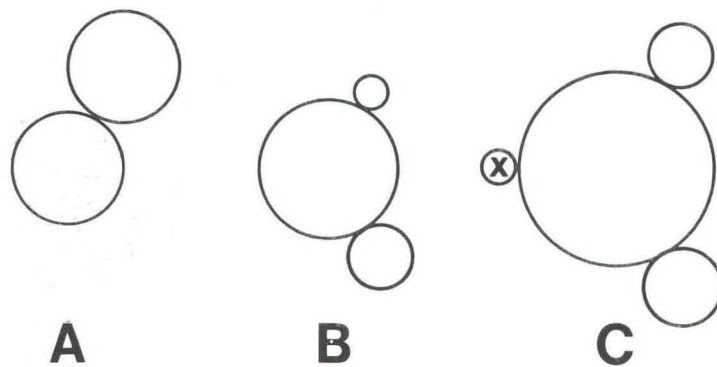


FIGURE 2 \* EXAMPLES OF CONFIGURATIONS THAT WOULD BE COUNTED AS TWO PRODUCTION UNITS.

- A. Two plants, neither of which has yet to produce a follower.
- B. A plant with two followers, both of which will be left for production.
- C. A plant with more than two followers of which all but two will be removed in the next pruning cycle.

plants per hectare has been reduced, the population looks «thinner» (i.e. as if it were carrying a lower population), although the plantation is carrying exactly the same plant population. If, during or just prior to the period when there is a maximum number of stems shot, the plantation manager decides to reduce the population in order to improve the quality as measured by stem weight and finger length, the plantation will be correspondingly «thinner» after the peak in production has been cut out.

Frequently in the past, plantation managers have reduced population in a given area prior to peak production because of apparent crowding and then after the peak have decided to increase population again because the plantation then appeared to be inadequately stocked. A continuous adjustment of population can be avoided by determining the maximum population that a given site will carry while producing the size and quality of fruit that the market demands. Once this has been decided the manager can view his apparently heavily stocked pre-harvest plantation and his relatively sparsely stocked post-harvest plantation with equanimity in the assurance that all other things being equal, what appear to be extremes of stocking will be of a temporary nature.

Since 1960, the Giant Cavendish variety has replaced the Gros Michel as the predominant dessert variety of banana on the world market (HORD, 1966). Cavendish populations range from a low of about 420 per hectare to a high of 2,500 or more in different parts of the world as a result of different production objectives in different areas and different concepts of site capacity. Generally speaking, the maximum amount of long-fingered fruit is produced on a given soil if the canopy is essentially closed but not crowded prior to a peak in production. On poorer soils smaller stems are produced on smaller plants but, because of the plant size, stand density can be profitably increased if water and nutrients are not limiting factors. Shade produced by an adequate canopy is invariably a major factor in grass and weed control.

There can be no standard population ideal for all production areas; the population that is best for a specific farm area must be determined on the basis of site quality and market requirements. In new plantations, the stand density is determined by the number of «seeds» (1) planted and the number of suckers allowed to develop per seed. The single follower system of pruning allowing only the oldest sucker from each producing plant to reach maturity makes it (1) part or whole of a banana rhizome.

relatively simple to maintain the initial population.

However, as the plantation ages, it suffers from losses due to such natural causes as disease, wind damage, and sometimes from inexperienced pruning. Under such conditions the farm manager usually asks the pruner to leave additional suckers on adjacent mats to eventually replace the plants lost. The planned increase in population brought about by this type of pruning, especially by pruning done just after the peak in production has been harvested, usually leads to overpopulation at the next peak because of the difficulty in visualizing the eventual space that the new sucker will occupy as an adult plant. This situation can be avoided by making a population count and only leaving enough additional followers to bring the population up to the standard for the area.

Through the years of banana production, there have been many systems used to count population but only one that has provided a consistent picture of population and therefore of potential production capacity no matter what time of year the count is made. This system was developed in Honduras in 1957 by the authors, and has since been spread by word of mouth to most of the banana producing areas of the world.

The system is based on a count of banana production units. Where plantations are pruned so that one follower is left to replace each producing plant, a production unit consists of the bearing plant or pre-bearing plant that will be left to produce fruit, plus the single sucker that will be left to replace that plant after it has produced fruit and been cut down. If an additional sucker is left on a plant with the intent that it be allowed to reach maturity, then it must be considered as a second production unit. Suckers that have been removed in the pruning cycle, or will be during a later cycle, are of course not counted in the production system (fig. 1 and 2).

The use of this system has made it possible to obtain a consistent population count at any time of year in a plantation of any age. It makes possible communication of information on population between the manager and his farm labourers and between people in different areas even though planting systems and pruning systems vary.

It is suggested also that population counts can be used as a universal site evaluation technique based on the number of plants per hectare required to assure an adequate canopy immediately prior to the time of peak harvest.

#### REFERENCES

- HORD (H.H.V.). 1966.  
The conversion of Standard Fruit Company banana plantations in Honduras from the Gros Michel to the Giant Cavendish variety.  
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