SOME STUDIES ON BREEDING SYSTEMS, PODSET AND YIELD IN CACAO (*Theobroma cacao* L.)

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ABSTRACT

Experiments were carried out to understand the effect of breeding system, podset and carrying capacity on yield, in two diverse populations of cacao, *viz.*, a naturalised population in Mount Saint Benedict and a plantation population in San Juan Estate, Gran Couva.

The population in Mount Saint Benedict was polymorphic for breeding system, consisting of self-incompatibles and self-compatibles at almost equal frequencies. The compatibility morphs were not significantly different in vegetative vigour or floral morphology. However, self-incompatibles produced significantly more flowers, set fewer pods and retained a greater percentage of pods to maturity compared to self-compatibles. However, the actual number of pods that reached maturity was the same for the two morphs, indicating that the carrying capacity of the trees was limiting yields.

In the plantation population in San Juan Estate, the THY clones showed a 1500 per cent increase in pod yield in hand pollinated treatments, compared to that under natural pollination. Although there were no significant differences in pod size between the two methods of pollination, the pod value showed an improvement under hand pollination. The per cent pods retained in the hand pollinated treatment was 71 compared to 84 under natural pollination. The results also showed that pods that were produced from later pollinations were more susceptible to cherelle wilting compared to those resulting from early pollinations. The study shows that under plantation conditions podset greatly limits yield and the implication of this to yield improvement is discussed both in the short-term

and in the long-term.

In an attempt to understand the scope for improving podset under natural pollination by improving the attractiveness of the flower, the natural podset of ICS clones was correlated to various floral characteristics. The results did not show any strong relationship. The size of flower parts, however, varied greatly among 239 clones from different populations investigated, but did not show a high correlation between them.