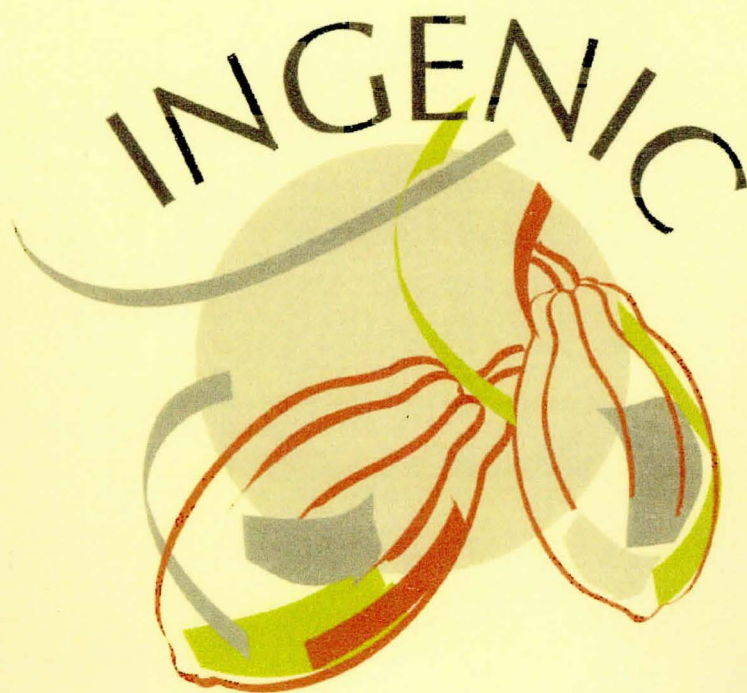
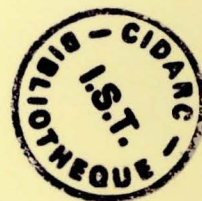


**3<sup>rd</sup> International Group for Genetic Improvement  
of Cocoa (INGENIC) International Workshop on  
the New Technologies and Cocoa Breeding**



**16 - 17 October 2000  
Kota Kinabalu, Sabah, Malaysia**

— ABSTRACTS —



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## IMPLICATION OF THE GENETIC STRUCTURE OF THEOBROMA CACAO FOR BREEDING STRATEGIES

Lanaud C. and Risterucci A.M., CIRAD, Montpellier, France

Diversity studies have been made by numerous authors using several kind of descriptors: morphological, enzymatic, molecular. A clear classification is difficult to obtain due to several reasons:

- the genetic mixing happened during the three last centuries,
- the samples studied are sometimes biased: eg. the Forastero were collected by Pound in Peru for resistance to witches broom,
- the first Criollo diversity studies were first based on genotypes present in germplasm and corresponding to hybrids rather than pure types,
- the results about the several populations are widespread in several different studies.

However the main results indicate:

- **Forastero populations.** An important diversity is observed between and within Upper-Amazon Forastero populations with a continue variation. The highest diversity has been observed in Ecuadorian populations LCTEEN and lower diversity in some populations as NA, GU (French Guiana populations). However, the studied samples from Upper Amazon are biased and prevent to compare really the extent of diversity between populations. The Ecuadorian Allen collections have been made in a larger area, without criteria of selection, and on a larger number of trees than the Peruvian Pound samples. Very few samples from Colombia and Brazil have been analysed in these studies.
- **Criollo and Nacional varieties.** "Ancestral" Criollo and Nacional have been identified to be nearly unique homozygous genotypes varieties. Modern Criollo and Nacional are in fact hybrid types resulting from introgression of respectively Forastero (reduced number of genotypes) in the ancestral Criollo and of Trinitario in the ancestral Nacional genotype.
- The **specificity and differentiation** of some populations / types as the French Guiana Forastero population, the ancestral Nacional and Criollo varieties could be explained by foundation effects or refuge areas.

The consequences for breeding programmes is that a reduced number of Upper-Amazon Forastero have been used until now and mainly coming from Pound's collections. Trees from some populations have been never tested (French Guyana Forastero, Ecuadorian LCTEEN clones, Colombian EBC clones, etc.) and a limited number of hybrid types have been tested. It will be useful to put in place prospective trials involving new clones and new hybrid types to exploit the diversity of natural populations of *T. cacao* not exploited until now.

The narrow genetic base used in breeding programmes is favourable to exploit linkage disequilibriums in these populations combining information from diversity and from genome mapping studies. Genome analyses (QTL mapping) are generally made on specific progenies and the results concern the studied clones only. It is possible to analyse with markers what degrees of linkage between markers and traits of interest (linkage disequilibrium) could have been conserved during evolution and domestication processes. This linkage disequilibrium could allow to get a larger benefit of the information provided by markers to screen the genetic resources of some groups as iMC, SCA, MO Forastero clones, Criollo, Trinitario, Nacional, when using markers closely linked to QTL identified in clones belonging to these groups.

