PROJECT SUMMARY

TITLE OF PROJECT: Genetic diversity and population structure of trees in fragmented dry zone forests of Central America - a pilot study.
R NUMBER: R5729
RNRRS PROGRAMME: Forestry
PROGRAMME MANAGER: OFI
SUB-CONTRACTOR: OFI
RNRRS PROGRAMME PURPOSE: Sustainable utilisation and conservation of natural woodlands enhanced.
RNRRS PRODUCTION SYSTEM: Semi arid
COMMODITY BASE: Tree fodder, fuelwood, charcoal, poles, sawn timber, non-timber forest products.
BENEFICIARIES: Forest dwellers
TARGET INSTITUTIONS: National forestry research institutions
GEOGRAPHIC FOCUS: Costa Rica, Honduras

START DATE:01/05/93**FINISH DATE:** 31/03/96
TOTAL COST:£189,689

1. Project purpose:
The dry forests of Central America are among the world's most threatened habitats. Under human influence their complex mosaics have become highly fragmented, to the extent that less than 2% of the original forests remain and only 0.1% is in protected reserves. These same forests are the source of many trees of socio-economic importance, such as the multipurpose *Leucaena* genera. Such is the extent of the forest degradation that several important timber species (eg *Bombacopsis quinata*) are almost commercially extinct, and some (eg *Swietenia humilis*) are on the CITES endangered species list. In the past, *in situ* conservation was the classical approach to maintaining the genetic diversity of endangered species. Now, increased understanding of the historical influence of human activities on genetic resources, considered in the context of the increasing pressure of human populations on forests and trees throughout much of the tropics, indicates that *circa situ* (within production systems) conservation may be more appropriate. However, current knowledge is inadequate for using this alternative approach in the design of effective strategies. There is a need for research into the dynamics of genetic diversity in forest fragments so that their genetic resources can be adequately conserved by the **development and promotion of techniques for sustainable management of forest resources by local people.**

2. Outputs:
The overall objective was **to study intra-specific genetic variation in *Bombacopsis quinata*, *Leucaena salvadorensis* and *Swietenia humilis*, under the prevailing conditions of habitat fragmentation within the Central American dry forest ecosystem, in order to design effective strategies for their conservation.** The specific objectives were:
1)to assess the effects of fragmentation on intra-specific genetic diversity, mating system and gene flow (within and between fragments);
2)to relate habitat and population size to intra-specific diversity;
3)to relate diversity to the proximity of other populations/habitats;
4)to devise appropriate sampling strategies for the three species under the prevailing conditions.

3. Contribution of outputs to project goal:
Substantial progress was made with assembling data with which to achieve the objectives, thus contributing to the knowledge needed for **the sustainable utilisation and conservation of natural woodlands to be enhanced**.

Working in the Guanacaste region of Costa Rica and the Choluteca region of Honduras, 15 suitable sites of differing conditions of forest were identified. Populations and individual trees of *B. quinata* and *S. humilis* were mapped, with the aid of the computerised facilities developed under R5648, and their flowering and fruiting phenologies studied. Controlled pollination investigations of *L. salvadorensis* and *S. humilis* commenced to study incompatibility mechanisms, if present. Based on information derived from the phenologies of *B. quinata* and *S. humilis*, and the distributions of these species within their populations, a seed sampling strategy was implemented for isozyme analysis. This was completed for three and one of the *B. quinata* and *S. humilis* populations respectively.

Although the original plan of work remained valid for the duration of the project, several events prevented its completion:

- a fire at one site, which delayed *S. humilis* seed collection;
- a delay in finding a suitable *L. salvadorensis* population;
- failure of planned collaboration with the National University of Honduras to materialise.

4. Dissemination products:
See PROREC output.

5. Follow-up indicated/planned:
The outstanding work referred to in 3 above will be completed as part of a new project, R6516.