

## PROJECT SUMMARY

**TITLE:** Evaluation of genetic variation in *Gliricidia sepium*

**R NUMBER:** R4525

**STRATEGY AREA:** Agroforestry and plantations

**PROGRAMME MANAGER:** OFI

**SUB-CONTRACTOR:** OFI

**START DATE:** 01/11/89 **FINISH DATE:** 30/09/92

**TOTAL COST:** £195,290

### 1. Background:

Rural populations throughout the tropics face increasing shortages of essential tree products. Trees also play a central role in supporting sustained agricultural production through soil stabilisation and amelioration. There is an urgent need to increase the supply of these products and services by identifying superior and well-adapted genetic material of the tree species best able to provide them. *Gliricidia sepium* is one of the tree species best suited for non-industrial tree planting. Its fast growth, nitrogen-fixing ability, production of a range of products and ease of propagation mean that it can readily be incorporated into rural communities for a range of different uses. *Gliricidia* is widely naturalised throughout the tropics but many populations have arisen from haphazard introductions of unknown quality, and probably with a very narrow genetic base. Provenance and progeny trials have been established throughout the tropics after a range-wide collection of *Gliricidia* in its native habitat was made (R4091 and R4179).

### 2. Objectives:

Generally, to elucidate the patterns of genetic variation for the genetic improvement of the species. Specifically, to:

- 1) evaluate provenance/progeny variation through coordinated trial assessments;
- 2) estimate the importance of genotype-environment interaction effects;
- 3) investigate the breeding systems of *G. sepium*;
- 4) investigate crossing patterns between *G. sepium* and its close relatives.

### 3. Results:

The project achieved its objectives. Evaluation of data from the *G. sepium* international provenance trial revealed substantial between-provenance differences in wood and leaf production. While there was some provenance interaction, several provenances were consistently superior across all sites. Therefore, the greatest genetic gain in the cultivation of *G. sepium* is likely to be from selection of the correct provenance. There is, however, scope for further improvement through breeding. The species was found to be an obligate outbreeder with differences among provenances in timing and abundance of flowering. Studies of molecular variation showed a high degree of genetic differentiation between populations.

### 4. Dissemination products:

See PROREC output.

### 5. Follow-up:

Awareness of provenance trial results among overseas collaborators resulted in high demand for commercial quantities of seed of the best provenances. However, severe degradation of the natural populations of *G. sepium* has too few trees to support this demand. Therefore an adaptive research project is being implemented to increase seed production by establishing seed orchards (R5401).