

PROJECT SUMMARY

TITLE OF PROJECT: *Leucaena* genetic resources: dissemination of results.

R NUMBER: R6296

RNRRS PROGRAMME: Forestry

PROGRAMME MANAGER: OFI

SUB-CONTRACTOR: OFI

RNRRS PROGRAMME PURPOSE: The use of trees within farming systems, including community and farm woodlots, optimised.

RNRRS PRODUCTION SYSTEM: Semi arid

COMMODITY BASE: Tree fodder, green manure, fuelwood, charcoal, poles.

BENEFICIARIES: Resource-poor farmers

TARGET INSTITUTIONS: National forestry and agriculture research and extension organisations

GEOGRAPHIC FOCUS: Worldwide

START DATE:01/04/95**FINISH DATE:**30/04/96

TOTAL COST:£54,991

1. Project purpose:

Leucaena leucocephala is a fast-growing multipurpose tree legume that has been widely promoted for planting in recent years. This increased use, however, has revealed some important limitations, principally poor adaptation to some sites and high susceptibility to attack by the psyllid defoliator *Heteropsylla cubana*. These limitations are largely attributable to the very narrow genetic base that has been used in *Leucaena* planting to date. On the other hand, the natural populations of the genus, which occur in Central America and Mexico, show considerable genetic diversity, including some species with desirable growth traits. The evaluation of this genetic resource, however, has been prevented by lack of basic biosystematic knowledge of the genus and the absence of range-wide seed collections. Consequently, R4524 (01/01/90 to 31/12/92) made comprehensive species and provenance collections. During the course of the work it became apparent that the genus was surrounded by much taxonomic confusion, which was mostly resolved by a full taxonomic revision under R4524E (01/01/93 to 31/03/95). This largely completed the assembly of a package of genetic materials and information. There is, however, need for resolving the remaining taxonomic confusion, and for the widespread dissemination of the information, to pave the way for a thorough genetic evaluation of the genus and the subsequent **identification of multipurpose tree species with improved performance and the promotion of their use in agroforestry systems.**

2. Outputs:

The overall objective of the project was **to assemble, synthesise, disseminate and promote the results of *Leucaena* research.** The specific outputs were:

- 1) results of research on *Leucaena* genetic diversity published in a user-friendly format, distributed and promoted;
- 2) identification of *Leucaena* species and hybrids made easier;
- 3) botanical information on *Leucaena* made available.

3. Contribution of outputs to project goal:

The above outputs were substantially achieved, thus contributing to the knowledge needed for **the optimisation of the use of trees within farming systems, including community and farm woodlots.**

Before these outputs could be achieved, much time was spent resolving several unexpected nomenclatural issues, including satisfactory typification of the generic name *Leucaena* itself, which turned out to be a synonym of *Acacia*. This was resolved with a short paper proposing conservation of the name *Leucaena* with a conserved type now in press in the journal *Taxon*. Several other papers, which include the naming of one new species, two new subspecies and proposals for four new name combinations were also submitted for publication. Among these papers, a major undertaking was the preparation of a new scientific monograph of *Leucaena*. This is the outcome of intensive research on the systematics of *Leucaena*, which provides explicit justification for the 22 species now recognised and resolves much of the nomenclatural confusion that accompanied previous research on the genus.

The accurate delimitation of species within *Leucaena* that the monograph provides enabled a comprehensive assessment of species diversity and characteristics within the genus to be produced for the first time. This revealed that there is great variation in tree size and form, environmental amplitude (including cold and drought tolerance), phenology, product quality (leaves and wood), psyllid tolerance, agroforestry potential, growth rates and weediness. A first synopsis of this diversity is given in the *Genetic resources handbook*, the main output of the

project.

Two databases - the 'OFI *Leucaena* seed database' and the 'Botanical database of *Leucaena*' - that had been assembled during the course of *Leucaena* research projects were finalised. The taxonomic updating of the seed database now ensures that the many seedlots distributed by the OFI for field trials are correctly identified. The botanical database, which contains data from more than 2800 botanical specimens from 22 herbaria, had a full synonymy and nomenclatural information added on the completion of taxonomic work and was used extensively in the preparation of the project's outputs.

4. Dissemination products:

See PROREC output.

5. Follow-up:

Although the *Genetic resources handbook* was completed in draft, there was not sufficient time before the end of the project for its review, editing, translation into Spanish and printing. There is an urgent need for funding to be secured to complete the publication process if the project's benefits are to be fully realised.

The *Genetic resources handbook*, together with the seed and botanical databases, provide a secure basis on which to proceed with the characterisation and evaluation of the *Leucaena* collections acquired during R4524. The necessary field trials and laboratory analyses are now proceeding within the *Leucaena* Research Network (LEUCNET).