1. Title: Coconut: Development of methods for clonal propagation of elite, disease resistant palms by somatic embryogenesis

Contract n°ERBTS3*CT940298

2. Tenderer information:

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3. Brief description of the case study

The coconut palm (Cocos nucifera L.) is a major agricultural crop in tropical areas. The only hopes for its asexual propagation lie on *in vitro* vegetative multiplication of high performance individuals using *in vitro* culture techniques and more particularly in somatic embryogenesis, remains the only hope for a substantial improvement in the productivity of plantations. Unfortunately, however coconut is a highly recalcitrant species as far as tissue culture is concerned.

In 1995, several groups involved in coconut regeneration research gathered together for the first time to start a joint effort to overcome the major difficulties encountered in coconut regeneration. Solid progress for the mastery of coconut regeneration has been made under this project funded by the European Community. Results obtained have allowed the regeneration of *vitro*plants in all the laboratories involved in the project. For the first time in coconut reliable protocols for plantlet regeneration have been obtained and can be duplicated in different laboratories. This represent an important breakthrough for coconut regeneration obtained within the duration of the project.

Key-words: coconut, somatic embryogenesis, embryogenic markers, growth regulator control, clonal propagation of selected trees

Why an international co-operation on coconut tissue culture?:

Coconut is an highly recalcitrant crop with a poor basic knowledge on *in vitro* tissue physiology. In the past negative competition between the different teams led to an exchange of “advertising information” but a very poor exchange of scientific information.

Coconut micropropagation require long-term research programmes with assured funding support which some countries cannot reliably provide without international assistance. This will increase research efficiency avoiding duplication of work and promote complementation and synergy of activities.
4 Thematic area: Genetic resource management and agro-ecology

5 Impact assessment information to be carefully documented:

5-1 What are the results obtained by the project?
- For the first time in coconut, reliable protocols for plantlet regeneration are available
- Plantlets have been obtained through somatic embryogenesis by all the partners involved in the project
- Key factors for somatic embryogenesis in coconut have been identified
- Putative protein markers for embryogenic tissues have been identified
- Basic knowledge on in vitro tissue physiology have been increased
- Links and exchanges between south and north partners have been strengthened
- Capabilities of researchers from south countries were upgraded

5-2 Who are the different beneficiaries of the results?
Coconut growing countries involved in tissue culture are the beneficiaries and mainly the Philippines (the first coconut oil producer) and Mexico.

5-3 How are the results been disseminated
- Organisation of an International Symposium on Coconut Biotechnology (December 1997). This gave us the opportunity to widely broadcast the knowledge and results acquired in the framework of this STD3 EC project.
- Publication of the symposium communications in a book edited by Kulwer academic press (The Nederlands)
- Technical Reports
- Publication of papers in international scientific journals
- Semestrial Coconut News Letter (information bulletin)

5-3 What is the impact of the project?
What is the impact of the project
The project demonstrated the feasibility of coconut tissue culture technics
Results generated by this project will serve as a basis to further develop tissue culture as a tool for coconut breeding (improvement of homogeneity and productivity of the plantations, propagation of disease resistant coconut).

5-4 What are the next steps foreseen by the partners
- Establishment of conditions to transfer the regeneration process from the laboratory to pilot scale
- Standardisation of the acclimatization process (studies on in vitro and ex vitro hardening procedure to reduce losses during the establishment of plantlets will be necessary)
- Establishment of experimental plots and pilot plantations with clonally propagated elite material
- The different partners will continue their collaboration through exchanges of informations (an electronic newsletter is planned and all the groups in the world that are currently working on coconut in vitro culture will be invited to participate). It is vital for research on coconut in vitro culture to exchange information efficiently.

5-5 What are the lessons learned in terms of factors that contribute to successful partnerships

Factors that contributed to successful partnerships were the establishment of a moral guideline at the beginning of the project, the quality of information exchanges and training organisation involving scientist exchanges.

Moral guideline

For a successful partnerships, it was important to establish a situation of confidence (trust) between all the partners. This was obtained on the basis of a moral guideline established through a consensual building involving all the partners. This was followed by the formulation of rules and recommendations.

The moral guideline was of prime importance to facilitated the smooth running of the project.

Exchange of information was defined by all the partners as a priority. Thus it was decided to publish a semester STD3 Coconut Newsletter. Six issues have been produced within the duration of the project. Annual workshops were organised during the project duration. During each of them, the work performed during the year by all the partners was presented and discussed. Discussion were conducted using the ZOPP methodology (methodology using visual aids (cards) with equality among participant, leading to a concensus building). This was followed by the establishment of a new work programme for the next year in full agreement with the initially planned project.

Trainings and visits

Trainings (1 to 2 months duration) and visits (one week) organised to exchange technics and knowledge contributed to strengthen the links between the different partners. Each training was followed by the establishment of training report that was sent to all the partners.

6 stage of development

The proposed case study is fully documented and already in a written form which requires only minor adjustments.