THE UNIVERSITY OF THE WEST INDIES

COCOA RESEARCH UNIT

REPORT FOR 1992

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Studies on seed transmission of witches' broom disease of cocoa: sterilization of infected beans and evaluation of resistance

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This study is a cooperative project between the Cocoa Research Unit and the CIRAD (France).
The main aim of the study was to find a method of disinfection of witches' broom infected seeds to prevent the inadvertent introduction of witches' broom disease from donor countries to recipient nations through importation of cocoa seeds for augmenting the genetic base of cocoa. Aspects of resistance of seeds inoculated with *Crinipellis perniciosa* were also studied to establish a possible classification of the ICS cultivars with reference to their reaction to *C. perniciosa*. The symptom expression due to witches' broom infection was examined to select the symptom types for devising a classification system. The symptoms studied were non-abscission of cotyledons, swelling of hypocotyls, proliferation of cotyledonary buds, necrosis levels and death. The final objective is to link the resistance classification of infected test plants to symptom expression of mature field trees viz. disease symptoms on branches, on flower cushions, and on pods.

a. Disinfection and viability studies

The following aspects were studied:

- thermotherapy of inoculated beans.

- fungicide treatments of inoculated beans with Moncut (Flutolanyl) and Bayleton (Triadimefon).

- determination of viability of seeds and internal damage in pods naturally infected with witches' broom disease.

The results obtained so far are:

- soaking freshly extracted infected seeds in water at 60° - 61°C for 1-3 minutes and removal of testas from treated seeds did not affect seed germination. However, germination of basidiospores and development of mycelium of *C. perniciosa* were inhibited. Witches' broom disease symptoms were absent on seedings raised from heat treated inoculated seeds. The controls (inoculated seeds without heat treatment) showed 80 - 100 % infection. Therefore, it is feasible to eradicate or effect a decrease of the pathogen on the beans when present at low levels. A fungicide treatment following the thermotherapy would complete the process of disinfection.

- Three days after inoculated seeds were set for germination, they were soaked for 3 - 4 hours in fungicide solutions (Moncut 500 ppm: Bayleton 100 ppm). All the seedlings raised from Moncut treated seeds were healthy. The seedlings generated

from seeds treated with Bayleton did not develop witches' broom disease. However, seeds subjected to longer soaking periods (>3 h) in Bayleton resulted in the appearance of phytotoxic symptoms on seedlings.

Control treatment showed 80 - 100 % of witches' broom infected seedlings.

b. Symptom expression and classification

Experimental material would be seeds originating from self pollination among ICS clones. Seeds from pollination of each ICS clone would be used in the following manner:

- Control 20 seeds
- Inoculation 20 seeds
- Seedlings 20 seeds

The seedlings will be allowed to grow for one year and then inoculated with basidiospores of *C. perniciosa* and the development of disease symptoms would be studied. The results of this study would be available in 1993 - 1994.

Studies on the role of resting spores in the biology of *Crinipellis perniciosa* (Stahel) Singer

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Studies have suggested the presence of what can be called resting spores, produced in the transitional period between the change from healthy to necrotic host tissue. The method of formation of such spores and the role in the life history of the fungus are being investigated.

In addition, attempts to induce basidiocarp production in sterile culture are being made.