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To: Department of State,
Agency for International Development.
Ref.: Contract # AID/ta-c-1368
Subject: First Annual Progress Report
From: Fred M. Eskafi, Assistant Research Scientist,
University of Florida.

INTRODUCTION

Lethal yellowing of coconuts (LY) is a mycoplasma disease killing the affected trees within 0.5 to 1.5 years, destroying at present an estimated 1,000 coconut trees per day in Jamaica. Total loss of trees to date are estimated at 2,500,000 in Jamaica. This has caused Jamaica to become an importer of edible oil at an annual cost of approximately \$10,000,000. In 1961, prior to devastating affects of LY, Jamaica was an exporter of coconut oil. Other regions affected by this disease are Florida, Dominican Republic, Haiti, Cuba, Islands of Bahamas, and Ghana.

OBJECTIVES

Objectives as outlined by the Institute of Food and Agricultural Sciences of the University of Florida (contracted agency) are listed in the position announcement E & N-3 as follows. "The incumbent would have the following responsibilities: (a) establish species of occasional palm feeders present on coconuts in Jamaica and compare with results obtained in Florida; (b) identify possible vector species and test for survival on coconut; (c) establish life history of selected species; (d) test by acquisition vector status of the species selected; (e) endeavor to transmit through vector injection the disease and produce evidence as to some of the transmission characteristics."

WORK IN PROGRESS AND/OR RESULTS

The objectives initiated, continued, or evaluated are as follows.

Establishment and Identification of Insects Feeding on Coconut Palms:

The procedure has been to tag, collect, and identify homopterans, hemipterans, thysanurans, and dipterans feeding on diseased and healthy coconut trees. In Spring Garden, eastern part of the island where disease is endemic, trees near the beach have been placed under cage-traps. The methods are developed and tested to inject these trees with a radioisotope material and collect the incoming insects in receptacles, yellow sticky traps, and light traps for autoradiography and identification of the "hot" insects which have fed on the tagged tree. Similar experiments are set up in Irwin Agricultural Research Station of the Ministry of Agriculture near Montego Bay, in the north coast where there has been no incidence of disease in the past few years.

All materials and methods are tested for this experiment, but slow cooperators in the US and the necessary permits for the radioactive materials have delayed the start of experiment.

Testing of Suspected Insect Vectors: Insects previously not tested have been emphasized in these experiments.

1. The incidence of LY and the economic damage on coconut fruit due to a mite, Eriophyes guerreronis, have been growing simultaneously in Jamaica, according to farmers. This mite has been shown to carry and transmit diseases of other crops. Techniques were developed for collecting, observing, and transferring these microscopic mites from the diseased coconut fruits in the eastern part of the island to healthy ones at Irwin in October 1977.

There were transfers to spear leaves, and fronds of healthy trees also. So far there is no incidence of disease in the experimental palms, though the incubation period may extend to 1.5 years.

2. Methods were developed for rearing or collecting of three Empoasca sp. which are being tested for LY transmission in isolated ecosystems in very large screened cages containing several healthy coconut palms and host plants of Empoasca plus 1) transplanted diseased palms, 2) several sections of diseased palms containing mycoplasma such as spear leaf, flag leaf, inflorescence and 3) Empoasca collected on the undergrowth at the active sites of the disease. This experiment is at the initial stages and the results will await the incubation period of at least 1 year.

CONCLUSIVE AND GENERAL REMARKS CONCERNING THE FUTURE LY RESEARCH IN JAMAICA

The plan of work as proposed by the author prior to arrival in Jamaica has been delayed and partly abandoned due to frustrations encountered because of the following factors.

1. Slow cooperation among the parties involved.
2. Logistics of operation outside of the US where materials for research need to be purchased.
3. Total unavailability of basic tools and expendible items including lumber, aluminum, seed, etc., due to shortages of goods in Jamaica.
4. Incomplete facilities in Coconut Industry Board, the University of the West Indies, and the Ministry of Agriculture (the cooperating agencies) for entomological research and insect transmission tests under controlled

conditions.

5. Heavy use of electron microscope and technical staff by ongoing committed plans of research.
6. Lack of provision in the present contract for substantial purchases of scientific equipments needed to carry on the research, or technical assistance.

It is suggested that longer time for contracts is necessary to accomplish objectives of LY research set in the position announcement E & N-3 of the University of Florida. This is not only due to problems mentioned above, but is also due to long incubation period of the disease; symptoms show on the test trees (0.5 - 1.5 year).

It is also suggested, if the parties involved decide to negotiate to extend the contract for another 2 years beyond March of 1979, that it would be highly desirable for the incumbent researcher to be able to spend 1/4-1/2 time at a University of Florida facility, such as Ft. Lauderdale Agricultural Research Station. Availability of materials and equipments is critical for basic laboratory studies to test the hypothesis developed by field observation or link parts of research together in field experiments in Jamaica. It is interesting to note that Ministry of Overseas Development of the UK has reached the very conclusion after several years of work in Jamaica and one of the LY team members, Dr. Simon Eden-Green, is due to return to Rothamsted Experimental Station for a few months to continue research not possible here. This is particularly important because 1) the Mycoplasmal diseases require very refined methods and specialized techniques in research, 2) although Jamaica is the most suitable place to study the etiology of this disease and relation with its vector, economic problems of the country and the lack of provisions for research

funds in the contract makes it very difficult to perform scientific research for acceptable conclusions, and 3) the LY has been a very unyielding problem since the start of research by FAO scientists in 1962, requiring more time and money and a closer cooperation with specialists around the world and the US than many other agricultural problems.

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