

RP-116

FEASIBILITY OF REPLANTING COCONUTS WITHIN OR  
ADJACENT TO CADANG-CADANG INFESTED AREAS

27 AUG 1973

By DOMINGO B. PROTACIO  
*Of the Bureau of Plant Industry*

LIBRARY.  
*Central Plantation Crops Research  
Institute, P.O. Kudlu, Kisaragod (India)*  
Separate from

THE PHILIPPINE JOURNAL OF PLANT INDUSTRY  
(Formerly The Philippine Journal of Agriculture)

Published by the Department of Agriculture and Natural Resources  
Quezon City, Philippines

VOLUME 34, Nos. 3-4, 1969

MANILA  
BUREAU OF PRINTING  
1971

061450

CATALOGUED

## FEASIBILITY OF REPLANTING COCONUTS WITHIN OR ADJACENT TO CADANG-CADANG INFESTED AREAS

By DOMINGO B. PROTACIO  
*Of the Bureau of Plant Industry*

WITH ONE PLATE AND ONE TEXT FIGURE

### ABSTRACT

Coco nifo seedlings were planted in an area where cadang-cadang had previously killed coconut trees and the soil around the trees was treated with (1) soil from the base of a tree in an advanced stage of cadang-cadang, (2) soil as in (1) but to which was added chopped leaves, roots, and trunk from a diseased tree, (3) soil microorganisms, particularly *Fusarium* spp., (4) unidentified spp. of nematodes, and (5) untreated control. Only one out of 358 trees in the experiment came down with the disease. It is concluded that it is relatively safe to replant cadang-cadang devastated lands with coconut.

### INTRODUCTION

The question has frequently been asked whether replanting of old coconut plantations that have been destroyed by cadang-cadang is economically worthwhile. Consequently, an experiment was conducted in 1957, in an attempt to answer this question. The present paper reports the results to date.

Experimental replanting of a 1.25-hectare grove destroyed by cadang-cadang was started in 1954 by C. A. Calica, A. E. Bigornia, and G. O. Pableo. The results of this replanting have never been published, but it is apparent that the trees are growing well and have a low incidence of cadang-cadang. As early as 1958, Price (6) recommended that farmers should be encouraged to replant their devastated land to coconut. His recommendation was based on the fact that many farmers in the Bicol area had already replanted their farms to coconut trees, which were apparently growing well. It was not known at that time how long such replanted groves would continue to remain free of cadang-cadang.

In 1963, Sill *et al.*, (8) in a survey made on different ages of coconut in relation to cadang-cadang incidence reported that

it was possible to live with the disease and that coconut growing would still be profitable in spite of cadang-cadang.

The present study differs from the experimental replanting of Calica, Bigornia, and Pableo in that attempts were made to induce cadang-cadang disease in the test plants by the application of soil, plant debris, microorganisms and nematodes.

#### MATERIALS AND METHODS

Approximately a portion of a two-hectare land at the east corner of the Guinobatan Experiment Station compound was selected. This area had a high incidence of cadang-cadang and the lots adjoining it on the north and south still manifest the disease today.

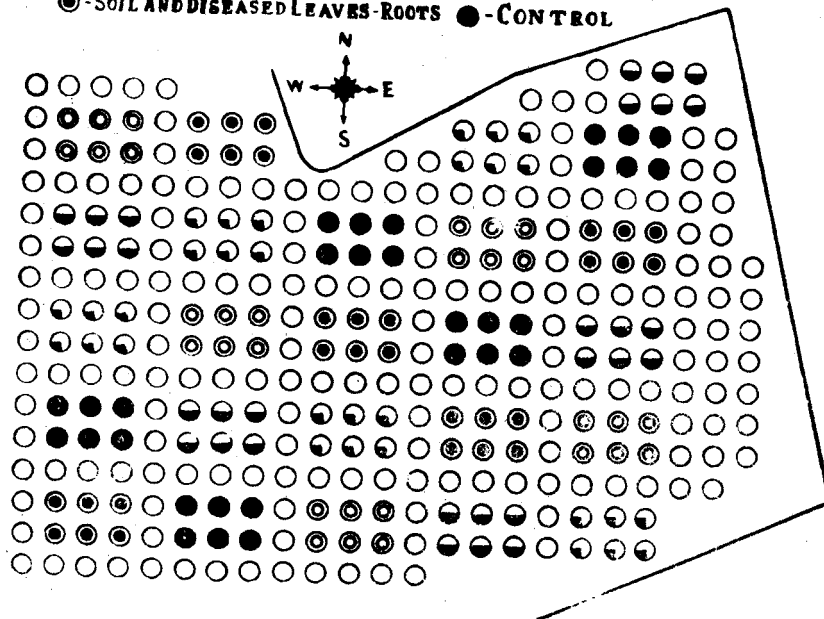
After removing all the diseased trees in the area to be replanted, one-year-old seedlings of coco niño were planted on a  $7 \times 7$  meters block arrangement (Text fig. 1). Before treating them, the soil to a depth of 1 m. in a radius of 1 meter around the base of the seedling was dug, except in the case of the control and buffer trees. This soil was replaced by soil taken from around the base of diseased trees or was treated with inoculum before being replaced. All the experimental and control blocks were cultivated and planted to *Pueraria javanica* cover crop. No fertilizer was applied during the 11-year period of the experiment. The treatments were as follows:

1. Soil from around trees killed by cadang-cadang or trees in a late stage of the disease;
  2. Soil from around diseased palms as in (1), plus plant debris. The debris consisted of chopped leaves, roots and trunks obtained from known diseased trees;
  3. Soil microorganisms, the predominant isolate of which was *Fusarium* sp. with *Cephalosporium* microspores. The organism has been grown in corn-meal-sand medium as described by Riker and Riker (7);
  4. Unidentified spp. of nematodes obtained by using the Bearmann funnel technique in a manner such as described by Goodey (1963) from soil and plant material collected from known diseased trees; and
  5. Control blocks which did not receive any treatment except the usual management normally applied to coconut plantations.
-

Each treatment was applied to 6 trees in a block surrounded by buffer trees, the blocks being arranged in a 5 × 5 latin square (Text fig. 1).

**LEGEND:**

- - BUFFER
- ⊙ - SOIL FROM INFECTED AREA
- ⊗ - SOIL AND DISEASED LEAVES-ROOTS
- ⊖ - SOIL-BORNE MICRO ORGANISM
- ⊕ - NEMATODE
- - CONTROL



**TEXT FIG. 1.** A 5 × 5 Latin square planting plan of the experimental coco niño variety of coconut located at the southeastern corner of the Guinobatan Experiment Station, Guinobatan, Albay, Philippines. (Drawn by Adolfo Oliquiano.)

The Philippine coco niño variety of coconut was selected because of its dwarf characteristic and its known susceptibility to the cadang-cadang disease. Price (6) noted that the coco niño variety of coconut is as susceptible to cadang-cadang disease as the Laguna and the Tambolilid varieties.

The coco niño seedlings were planted on November 15, 1957, and the first application of the various treatments was made in December of the same year. About 10 kilograms of the treatment material were dumped around each seedling. The

treatment was continued at quarterly intervals until a total of 6 applications was made. Periodic observations were made prior to each treatment, and were continued at irregular intervals after the treatments had been terminated.

#### RESULTS AND DISCUSSION

In the period of 11 years, only one tree in the experimental plot came down with cadang-cadang. This tree was one of the controls, which was first observed with symptoms on January 12, 1961, two years after planting. It died a year later. The other trees grew very well (Plate 1).

The results to date indicate that the coco niño variety of coconut will grow well in soil in which cadang-cadang diseased trees had previously been growing. The results also indicate that young trees cannot be infected with cadang-cadang by placing around their roots (1) soil taken from around trees in an advanced stage of disease, (2) chopped leaves, roots, and trunks from diseased trees, (3) certain soil organisms of the *Fusarium* spp. type, or (4) certain nematodes extracted from soil around the base of diseased trees. This is in agreement with the results obtained by Palo (5) who stated that nematode population and cadang-cadang incidence are not correlated.

The fact that only one of the 358 trees in the experimental plot became diseased in a span of 11 years, suggests that the soil in a disease-present area does not contain an infectious agent or a toxic element capable of causing cadang-cadang and that the soil is not significantly deficient in a particular nutrient needed for normal growth of trees. The results suggest, on the other hand, that the disease is caused by an infectious agent such as a virus that is transmitted relatively infrequently, perhaps by an insect vector. They, therefore support the virus hypothesis advanced by Ocfemia (4) and subsequently supported by others. (2, 3, 6.)

From the results of the experiment, it can be concluded in agreement with Sill *et al.* (8) and Erquiaga (1) that coconut farmers in the Bicol region can live with the disease and can reasonably be assured that replanting devastated areas with coconut is economically feasible.

---

*Protacio: Replanting Coconuts in Cadang-Cadang* 175  
*Infested Areas*

LITERATURE CITED

1. ERQUIAGA, B. DE. 1958. A practical approach to the cadang-cadang problem. Paper read at the conference on cadang-cadang held in Legaspi, Albay, 22-24 August 1958. (Mimeographed)
2. MARAMOROSCH, K. 1961. Report to the Government of the Philippines on the cadang-cadang disease of coconut. FAO Report No. 1333.
3. MCWHORTER, K. P. 1959. Report to the Government of the Philippines on the cadang-cadang disease of coconut. FAO Report No. 1107.
4. OCFEMIA, G. O. 1937. The probable nature of cadang-cadang disease of coconut. *Philippine Agric.* 26: 338-340.
5. PALO, A. V. 1964. A preliminary report on species of plant parasitic nematodes found in cadang-cadang infected areas in the Bicol region. *Phil. Jour. of Agric.* 28: (1-2) 31-34 M. Colcol & Co., Inc. Manila.
6. PRICE, W. C. 1958. Report to the Government of the Philippines on the yellow mottle decline (cadang-cadang) of coconut. Expanded Tech. Assistance Program, FAO Report No. 850.
7. RIKER, A. J. and R. S. RIKER. 1936. Introduction to research on plant diseases. John S. Swift Co. N. Y. 117 pp.
8. SILL, W. H. JR., A. E. BIGORNIA and R. P. PACUMBABA. 1965. Incidence of cadang-cadang disease of coconut in trees of different ages and its relationship to practical control. *The Phil. Jour. of Plant Industry* 29: (3-4) pp. 87-100. Bureau of Printing, Manila.

## ILLUSTRATIONS

### TEXT FIGURE 1

A 5 × 5 Latin square planting plan of the experimental coco niño variety of coconut located at the southeastern corner of the Guinobatan Experiment Station, Guinobatan, Albay, Philippines. (Drawn by Adolfo Oliquiano).

### PLATE 1

Healthy 11-year-old coco niño trees as illustrated in the experimental planting plan (Text fig. 1). Note personnel doing one of the routine farm operations. (GES photo by Angelino Olaguera).

PROTACIO: REPLANTING COCONUTS IN CADANG-CADANG INFESTED AREAS]

[PHIL. JOUR. PLANT INDUSTRY, 34, NOS. 3-4

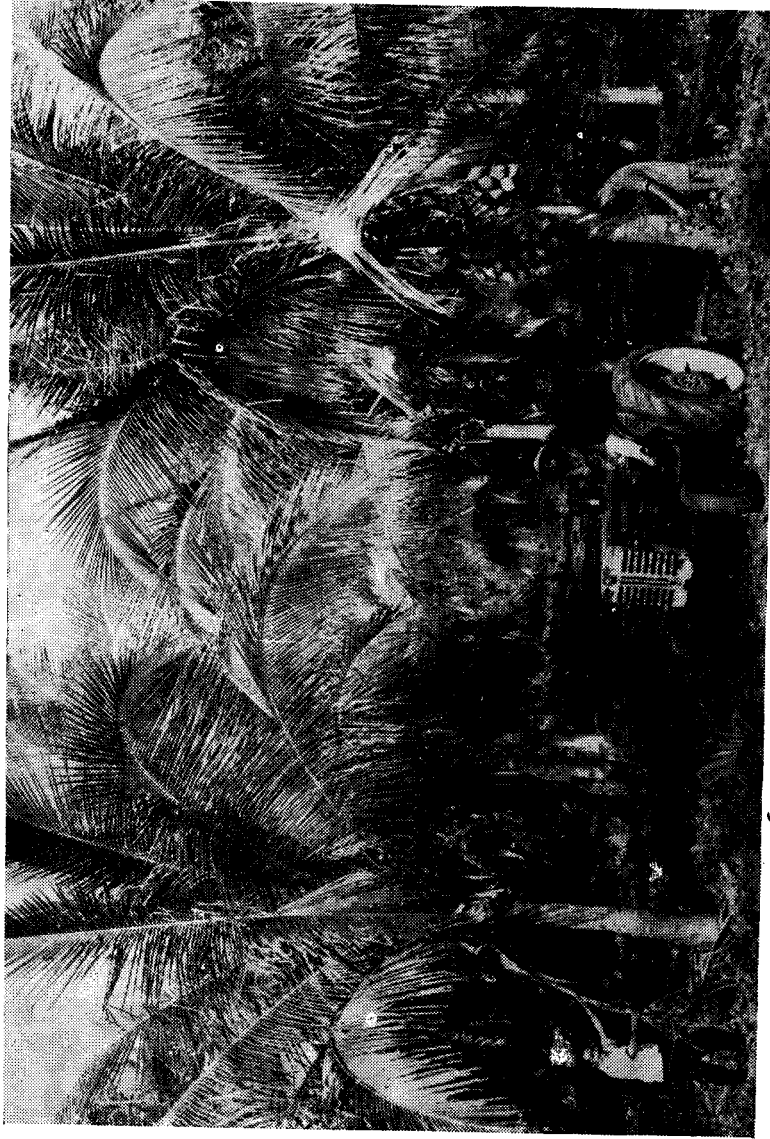


PLATE 1