

COCONUT FALL

(Preliminary Paper)

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In December of 1923 the attention of the writer was called to the falling of nuts and leaves from coconut palms. The section in which this disease was discovered contained a very large number of trees and in some places the majority of them were infected.

The symptoms were: (1) A drooping of the lower leaves which was due to a black decay at the base of the petioles. These leaves drop prematurely.

(2) A premature dropping of the nuts in various stages of growth from the very smallest up to those that were practically mature. All these nuts showed a black discoloration at the base. In some cases this blackened area became dry after the dropping of the nuts, while in other cases it developed into a soft rot. This variation was undoubtedly due to the dry or wet condition. In case the disease did not attack the nuts until they were practically mature, the husk only was infected and there was no loss. In those cases in which the young nuts were infected, they fell before maturity and the losses were very heavy.

(3) The infection was less on the tall than on the low trees.

This disease was never observed to kill a tree but loss of nuts was alarming and the drooping of the lower leaves was very unsightly.

An examination of the infected areas showed an exceptionally large amount of litter consisting of old leaves, husks and nuts in various stages of decay.

A study of the diseased nuts showed a very general infection with *Thielaviopsis paradoxa* (De Syner v. Hohn). In many cases pure cultures were secured direct. A study of the litter showed a very general and very heavy infection with this same fungus.

A few months later our attention was called to two isolated trees which were almost ready to bear fruit. These trees were not making a satisfactory growth; the new leaves were not fully expanded and were very much crumpled. These trees were cut and examined. In the first one a very large amount of decay was found in the center of the trunk but none in any other part. The cultures were overrun with saprophytes and very unsatisfactory for study. In

the second there was a small streak of decay from the top to the base of the tree. Cultures from this decay gave abundant growth of *T. paradoxa* but it was impossible to determine whether the infection was primary or secondary. This fungus was reported in the 1912 Annual Report of the Porto Rico Agricultural Experiment Station at Mayagüez as attacking the leaves of the coconut palm but no mention was made of its attacking the nuts. It has also been reported from Jamaica as the cause of a disease of the coconut known as "leaf-bitten," but the symptoms are entirely different from those of the disease found here. It has also been reported from Ceylon (Cries. and Agric. Journ. Royal Botanical Garden, Ceylon. 4 [1909] No. 22 S. Sundararaman on "The Coconut-Bleeding Disease." Bul. 127, Agricultural Research Institute, Pusa) as causing bleeding and decay of the trunks of the coconut palm, but no such condition here has come to our attention. It has also been reported from Florida as the cause of a trunk decay (H. R. Fulton. Phytopathology 12: 398-399, 1922). This fungus is also the cause of a root and stem rot of sugar cane and a fruit rot of the pineapple. In some parts of the world it reduces the germination of the sugar cane. It not only causes a rotting of pineapple fruits but frequently attacks and kills the slips after setting.

Inoculation from pure cultures of this fungus was made on trees in the Station grounds where there was no evidence of the disease. These inoculations were made by drenching the inflorescence and young nuts with water to make conditions as nearly as possible like those following rainfall. Spore of the fungus from pure culture were mixed in water in an ordinary atomizer and sprayed on the inflorescence and young nuts. This was done about 4 o'clock in the afternoon. In a few days we had a very general infection and falling of nuts from the smallest up to those about one-fourth grown. The symptoms were typical and the organism was very easily recovered from these nuts. No effort was made to disinfect these trees, but the disease disappeared in a very short time indicating that it was controlled largely by natural conditions.

The moist litter in the plantations furnishes ideal conditions for the growing of this fungus and the spores are produced in great abundance and readily carried by wind currents. The greater infection on the low rather than on the tall trees indicates that the greatest source of infection probably comes from the litter on the ground and that the spores of the fungus are carried up by wind currents. However, the reduced infection in the tall trees may be

partly due to the drying influence of the sun which would naturally make conditions unfavorable for infection.

An examination of several groves showed that the disease was most prevalent in the presence of moisture and litter. The disease was not found in the interior and in only a few places along the coast.

We did not carry on any work for the control of this disease but recommended a very general cleaning up of all litter in the plantations, and a removal of the diseased leaves and nuts so far as possible. This treatment was carried out and in some places the ground has been plowed. The reports indicate that the disease has practically disappeared.

The writer was assisted in his work by Mr. R. A. Toro and by Mr. J. A. B. Nolla.
