SECOND PROGRESS REPORT ON BUNCHY-TOP OF ABACÁ, OR MANILA HEMP

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In the abacá plot of the Department of Agronomy of the College of Agriculture at Los Baños, Laguna Province, Philippine Islands, in specimens collected from Cavite Province, and in transmission experiments of bunchy-top using *Pentalonia nigronervosa* under controlled conditions, it has been noted that in advanced stages of the disease "heart rot" sometimes sets in. This observation is of special significance, because of the attention which heart rot has attracted. According to Mr. Melanio R. Calinisan, who is working on the relation of nematode (*Heterodera radicicola*) to bunchy-top of abacá, the abacá farmers of Cavite Province believe that the heart rot is more important than the bunchy-top. In a conference with Mr. Felicisimo B. Serrano, Assistant Plant Pathologist of the Philippine Bureau of Agriculture in Manila, who has been working on the heart rot of abacá since 1920, it was learned that Mr. H. Atherton Lee, formerly Mycologist of the Philippine Bureau of Science in Manila, considered heart rot as the more destructive of the two abacá diseases. Lee and Serrano[1] reported having isolated a *Fusarium* closely resembling *F. cubense* from cases of heart rot of abacá. These authors claim that they obtained positive results from inoculation experiments using *F. cubense* for the production of abacá heart rot. It is not clear, however, how this vascular *Fusarium* of the banana could produce heart rot on abacá.

In aphid-transmission experiments of bunchy-top of abacá under controlled conditions, it has been noted that the first symptom of the disease is the appearance of yellowish white, indefinite chlorotic areas on the margin of the youngest leaf. The green parts of the leaf blade on each side of the midrib are darker green than the leaves of normal plants. The leaves produced are smaller and show a tendency to curl up along the margin. As the curling of the leaf margin is a more characteristic symptom of the virus form of bunchy-top of abacá than the bunching of the leaves, the disease might better be known as "curly-top." The presence of the greenish yellow or yellowish white areas and its transmissibility by aphids might group the disease with the mosaics or transmissible chloroses. The chlorotic areas

[1] Lee, H. Atherton, and F. B. Serrano. Banana wilt of the Manila hemp plant. Phytopath. 13: 253–256. 1923.

are retarded in their normal growth, and as a result an affected leaf has a tendency to tear along the margin. Very often delicate, thin, transparent, membrane-like areas of different shapes and sizes are present on the chlorotic portions of the youngest leaf. These membrane-like areas are visible before the leaf unfolds or immediately after (Fig. 1, a). When the transparent membrane-like areas are present on the greater portion of the unexpanded

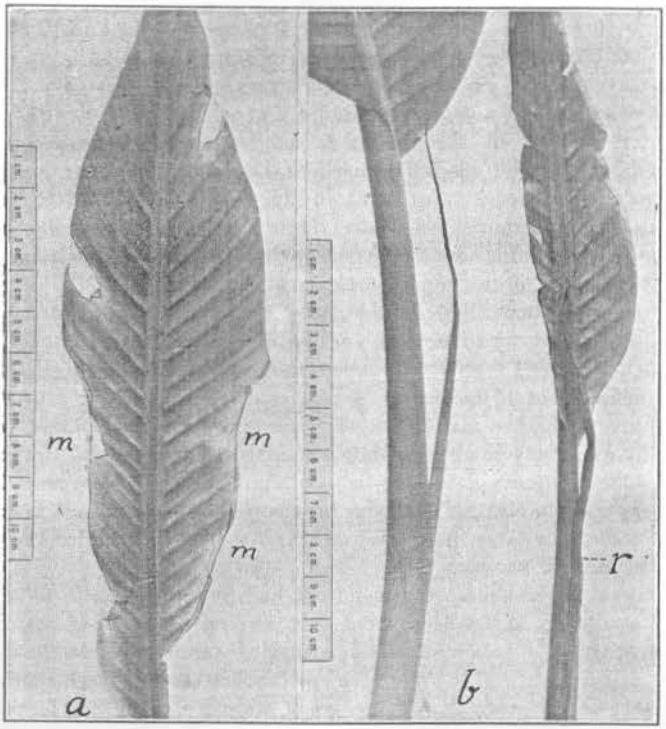

FIG. 1. (a) A young leaf of abacá, C. A. 4293 Itom, affected with bunchy-top from aphid-transmission experiments showing the membrane-like areas (m) along the margin of the leaf. The membrane-like tissues on the upper part of the leaf were torn off.

(b) At the left is shown the youngest leaf of a healthy abacá seedling, C. A. 4293 Itom. At the right is the heart of a bunchy-top-infected abacá seedling from aphid-transmission experiments showing the browning of the youngest leaf (r) and the beginning of the rotting of the brown tissue.

All photographs were taken by the Photographic Laboratory of the Bureau of Science at Manila, P. I., two months after inoculation.

youngest leaf, browning follows, and if weather conditions are favorable rotting sets in (Fig. 1, b), starting from the top and working downwards. In this type of heart rot, bacteria are present in great abundance and hasten the rapid decay of the soft tissues of the heart. This type of heart rot is probably the same as Reinking's bacterial heart rot of abacá.[2]

Although it is not claimed that all heart rots of abacá are secondary diseases, it seems that, in bunchy-top infected districts at least, many of the heart rot cases are probably the final stages of bunchy-top.

In results thus far obtained, it has been noted that the abundance of nematode galls in the roots of abacá, the rotting of roots due to various soil fungi, and close planting may induce bunching of the leaves resembling that of the aphid-transmissible bunchy-top. In bunchy-top brought about by any of these three conditions, however, the chlorotic areas on the leaves, the diminution of the size of the leaf, the curling of the margin, and other malformations are not shown. Further work is in progress.

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[2] Reinking, Otto A. Philippine economic-plant diseases. Philippine Jour. Science Sec. A. 13: 165–274. 1918.