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Cassava

Bacterial Blight

(CBB)



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CASSAVA PROGRAM

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The most important bacterial disease of cassava is Cassava Bacterial Blight (CBB). This disease was first recorded in Brazil (1), but later was reported in Colombia (2) and observed in several other countries in South America and Africa.

The symptoms of the disease are similar to those reportedly induced by Xanthomonas manihotis (Arthaud-Berthet) Starr, but studies of the morphology, physiology, serology, and phage susceptibility of the bacterium isolated in Colombia, Brazil, and Venezuela suggest that it differs from xanthomonads and is similar to some pseudomonads (2). The cassava blight bacterium is distinguished from some species of Erwinia, Pseudomonas, and Xanthomonas by serological and phage-typing methods (2). These methods may also be used to separate it from other plant pathogenic bacteria. Since its taxonomic position is not fully defined, this bacterium has been named CBB.

SYMPTOMS

The symptoms of the disease can be subdivided into two groups:

1. Symptoms associated with plants established from infected planting material:

a) A first indication of infected planting material is poor establishment, when soil conditions appear satisfactory.

b) The shoots produced from infected planting material wilt without showing any leaf blight. This is usually followed by die-back, often with exudate on the stems (Fig. 2).

2. Symptoms associated with the spread of the pathogen from a focus of infection. This comes from infected planting material or is carried by a "machete" from a nearby field of infected plants. The symptoms appear first on the leaves and are as follows:

a) Water-soaked, grey angular lesions appear on the leaf surface. These are especially prominent on the underside of the leaf (Fig. 3).

b) These leaf spots grow and cause a leaf blight. Care must be taken not to confuse the leaf spots or leaf blight with those caused by fungi. *Cercospora* leaf spots are easily identified by the circular lesions which are either white or light or dark-brown in color depending on fungal species involved. *Phyllosticta* leaf blight can be confused with CBB; however, the symptoms differ. *Phyllosticta* sp. produces lesions with concentric rings often spreading from the leaf tip or a point on the leaf margin, and does not produce exudate from the veins on the underside of the leaves which is typical of CBB.

c) Wilting follows blight and spreads throughout the plant, even to branches showing no other symptoms (Fig. 1).

d) Finally the plant defoliates and the growing tips of wilted branches die back. The fungal diseases caused by *Phyllosticta* sp., *Cercospora* spp. and *Colletotrichum* sp. can also cause defoliation. The leaf symptoms can generally be used to distinguish between the diseases. *Colletotrichum* sp. causes the leaf to turn uniformly brown before falling. *Phyllosticta* sp. and *Colletotrichum* sp. can both cause die-back during severe attacks. Care must be taken to prevent confusion between symptoms caused by fungi and symptoms caused by CBB.

Gum exudation from the petioles and stems of infected plants is common. Also, vascular strands of infected petioles and stems necrose and appear as brown strings. This vascular discoloration may also spread into non-infected roots (2, 3).

SPREAD OF THE DISEASE

a) The bacterium can survive for long periods in the planting pieces. Thus infected planting material, frequently showing no visible symptoms, often spreads the disease from one area to another (Fig. 4).



Figure 1



Figure 2.



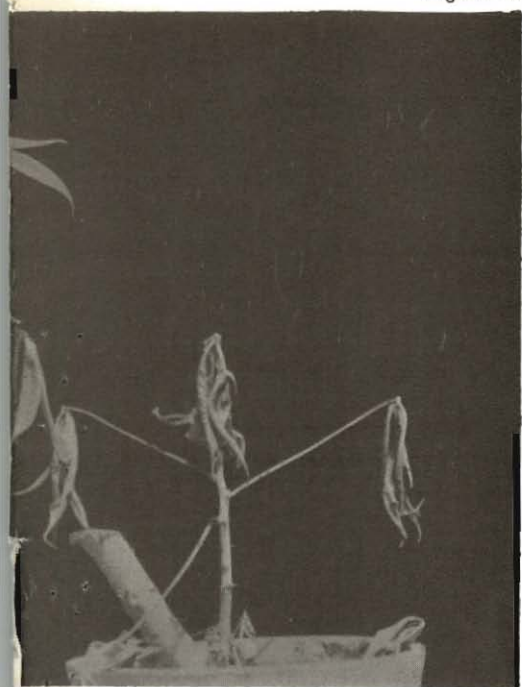
Figure 3



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Figure 4.



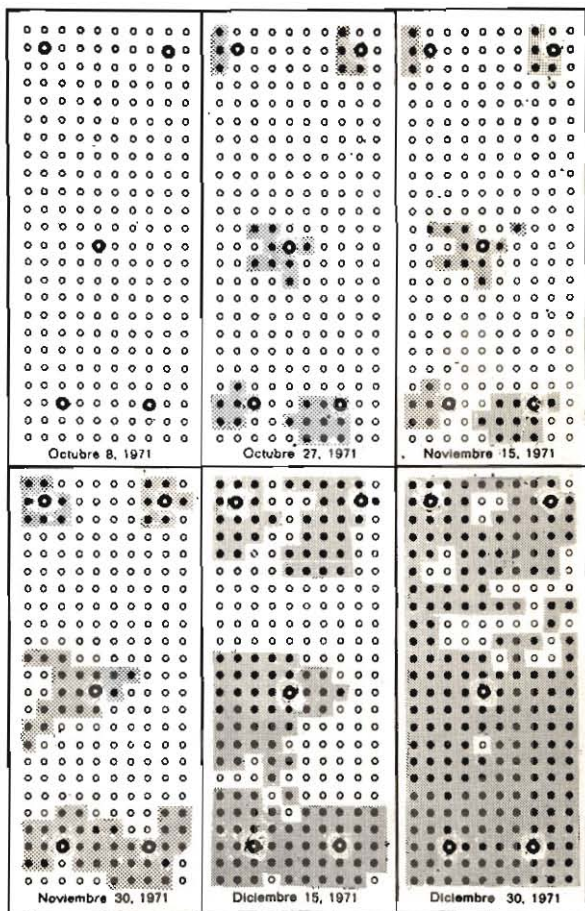


Figure 5.

- Figure 1. Wilting and leaf drop of cassava caused by CBB.
- Figure 2. Defoliation and die-back of cassava plant infected with CBB.
- Figure 3. Leaflets of cassava showing angular lesions caused by CBB.
- Figure 4. Dissemination of CBB by Infected vegetative planting material. Left: healthy shoot from a healthy stem cutting. Right: diseased shoot from an Infected stem cutting.
- Figure 5. Spread of CBB in the field from initial source of Infection (○) in experiments conducted between September 15 and December 31, 1971. Results were recorded as number and position of plants infected at 15-day periods after inoculation.

b) The bacteria are easily transferred from plant to plant and field to field by using infected tools such as "machetes," infected machinery or clothing, or by personnel.

c) Debris and volunteer plants from previous cassava crops are often a major source of infection.

d) Once a primary infection establishes itself, the disease spreads rapidly during the rainy season because of rainsplash (Figs. 5 and 6).

CONTROL

Once the disease is present in a crop, complete control is not possible but spread of the epidemic can be retarded by roguing out infected plants. Control

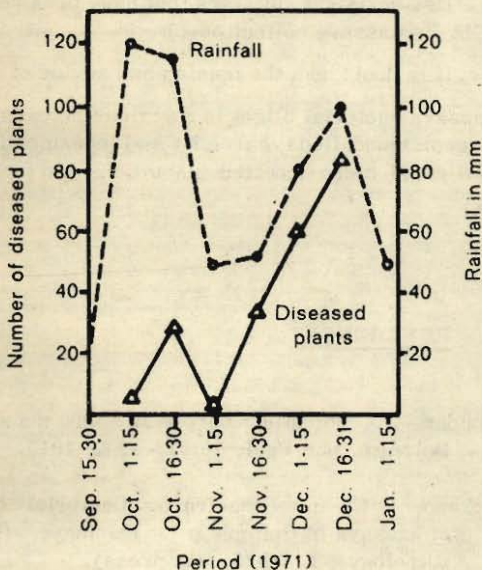


Fig. 6. Spread of CBB in the field from initial sources of infection in experiments conducted between September 15 and December 31, 1971. Relation of total rainfall (mm) and number of diseased plants in each 15-day period.

can be achieved by eradicating the disease from plantations by the following means:

a) After harvesting, remove and burn all plant debris. Plough the field and do not plant cassava for six months. Eliminate all cassava volunteer plants.

b) Establish new plantations using only bacteria-free planting material obtained from disease-free plantations.

c) Prevent the movement of people, tools and planting material from infected to clean areas. Disinfect tools, machinery, and footwear by using a five percent formalin dip. Clean areas can be kept bacteria-free by these quarantine regulations.

d) Use resistant cultivars that have been reported in CIAT's cassava collection (3).

e) If in doubt, ask the opinion and advice of CIAT.

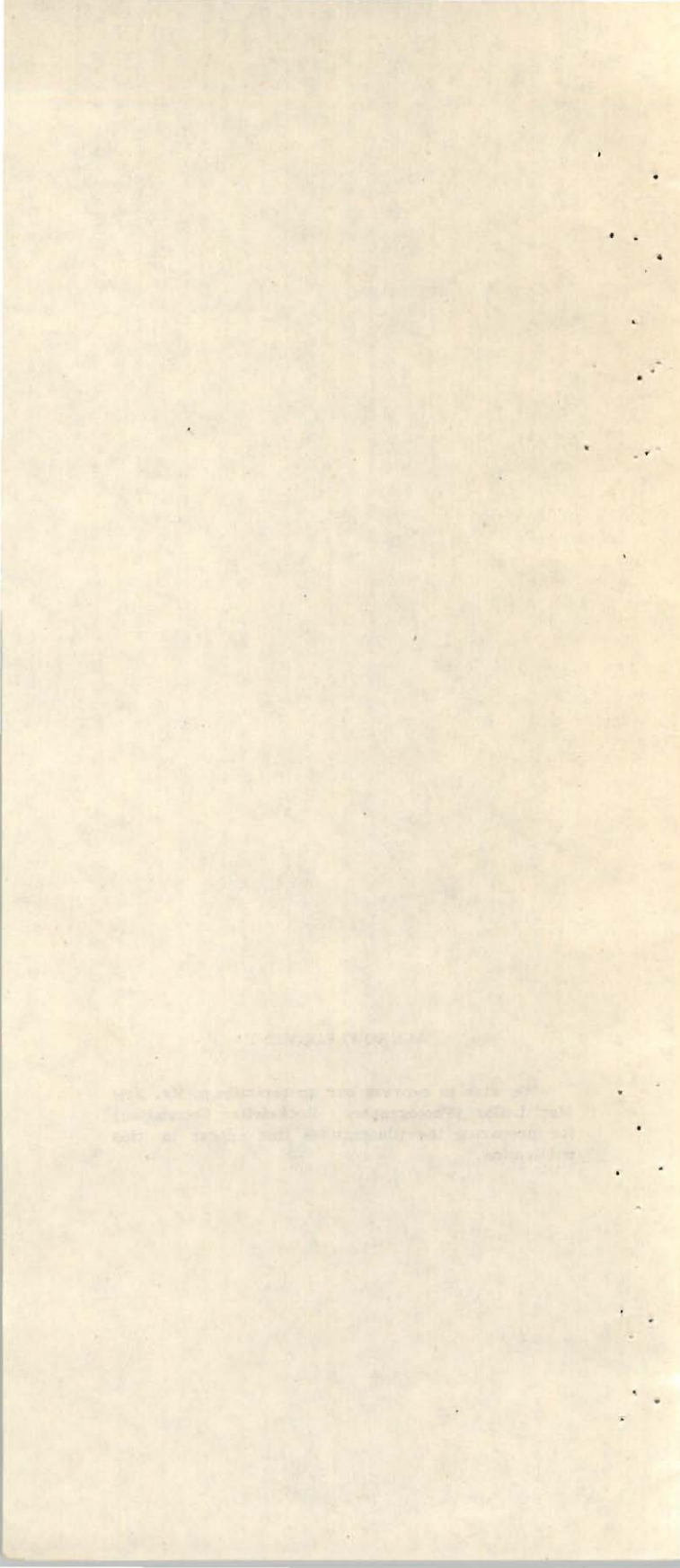
Cassava bacterial blight is a serious disease. The above recommendations, carefully and conscientiously followed could clean infected plantations and increase yields.

REFERENCES

1. Bondar, G. Molestia bacterial da mandioca. Bol.Agr. Sao Paulo 16:513-524. 1915.
2. Lozano, J. C. and Sequeira, L. Bacterial blight of cassava in Colombia: I. Etiology. Phytopathology 63. 1973. (in press).
3. Lozano, J. C. and Sequeira, L. Bacterial blight of cassava in Colombia. II. Epidemiology and control. Phytopathology 63. 1973. (in press).

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