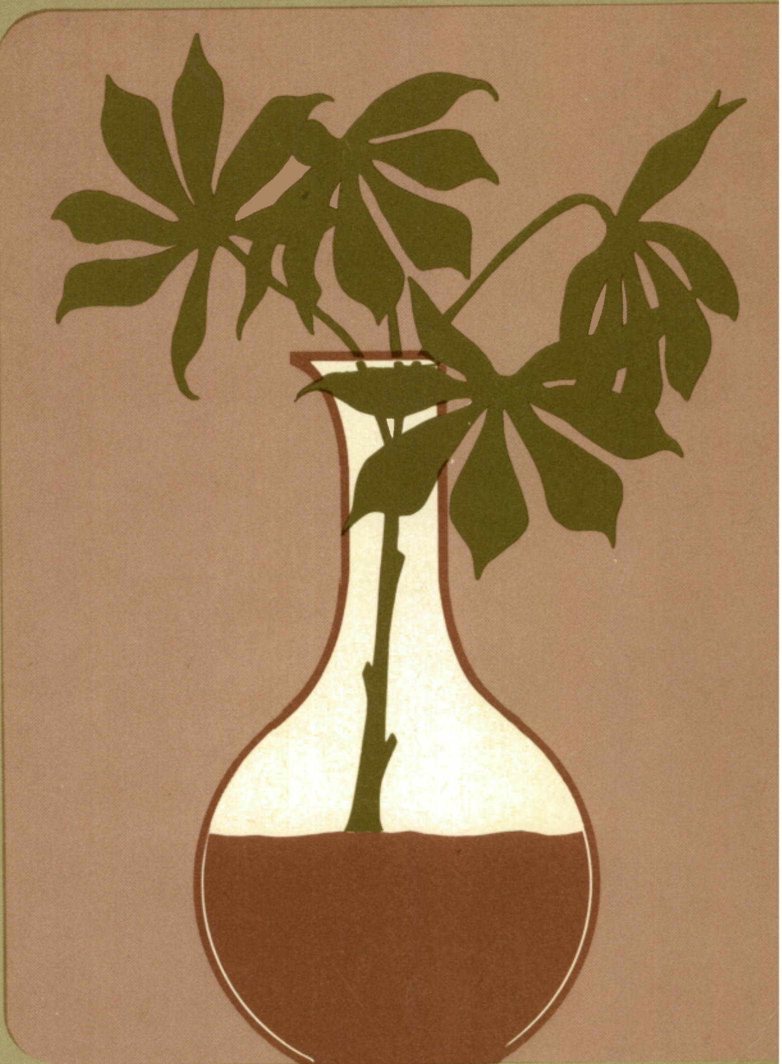
CASSAVA BACTERIAL BLIGHT

report of an interdisciplinary workshop held at IITA, Ibadan, Nigeria, 1-4 November 1976.



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IDRC-096e

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IDRC IDRC-096e
Cassava bacterial blight: report of an interdisciplinary workshop held at IITA, Ibadan, Nigeria, 1–4 November 1976. Ottawa, IDRC, 1977. 36p.

/IDRC publication/. Report of a workshop on the /cassava/ /bacteria/l blight (CBB) /plant disease/ in /Africa south of Sahara/ — discusses the /diagnosis/ and /geographic distribution/ of CBB, influence of shade (/solar radiation/) and /intercropping/ on its incidence, /plant breeding/ for /disease resistance/; /disease control/ efforts in /Nigeria/, /Zaire/ and /Ghana/. Includes /bibliography/s, /list of participants/ and country statements from /Benin PR/, /Congo PR/, Ghana, and /Togo/.

UDC: 633.68 ISBN: 0-88936-143-6

Microfiche Edition $1

IDRC-096e

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Contents

Influence of Shade and Intercropping on the Incidence of Cassava Bacterial Blight

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National cassava surveys and germ plasm collections were commenced in Nigeria in 1973 to assess local farm practices and factors affecting production. The latter includes incidence of cassava bacterial blight (CBB). At least two of the farms in each area visited were homestead farms and the others distant farms. In both Imo and Anambra states where the survey was carried out between July and October, CBB incidence was consistently lowest in homestead farms and highest in distant farms (Arene 1975).

Generally in the areas surveyed, homestead farms are characterized by continuous intercropping under compound shade trees. Fertility is maintained by use of farmyard manure and household refuse. In distant farms, monocropped cassava with crop rotation is the general practice.

The experiments reported below were designed to determine the effect of shade and intercropping on CBB incidence on cassava.

Effects of Shade

Twelve 15-cm clay pots filled with sterile soil were grouped into four sets and arranged in a randomized block design with four replicates to compare the effects of soil infestation and shading on CBB. Shading was achieved by placing the pots under a white, transparent polythene shade. Infected cassava debris served as source of inoculum. This was thoroughly mixed with the soil for infestation. Two apparently healthy cassava cuttings of variety 53101 were planted in each pot. These were regularly watered. The percentage of diseased shoots was estimated monthly for 5 mo.

Effects of Intercropping

A randomized block experiment with 10 replications was used to compare CBB incidence as affected by the following treatments: (1) cassava planted alone; (2) cassava interplanted with maize; (3) cassava interplanted with melon; and (4) cassava interplanted with melon and maize.

Variety 53101 was used as the test crop. Each plot was 0.0076 ha and was planted at a plant population density of 9259 cassava stands/ha (90 cm on 120-cm ridges). Maize was planted on both sides of the ridges between cassava stands; melon was planted on the ridges after every other cassava stand. CBB was recorded after 4 mo when the melon had been harvested.

Results

The effect of shading on the percentage of diseased shoots at various times after planting was estimated by multiple regression analysis using the equation:

$$y = 29.06 + 20.30x_1 + 2.87x_2 - 3.28x_1x_2 - 6.02x_3 - 2.56x_1x_3$$

where x_1 = shading, x_2 = infestation, and x_3 = time from planting (months; the coefficient of determination $r^2 = 0.566$).

The infestation of the soil per se was not significant in contributing to the number of diseased shoots, but shading significantly affected incidence of the disease. (Fig. 1). Thus there were no differences between infested and noninfested pots when both were either shaded or unshaded, but the difference between shaded and unshaded pots was significant with CBB incidence higher in unshaded pots. Except for the 5th mo after planting, which had the highest percentage of incidence, there were no significant differences in incidence with time.

The highest incidence (22.8%) was found in the cassava planted alone. This was significantly higher than the incidence in any of the other three intercrop treatments.

Discussion

Although the combinational differences in the variables (shading, soil infestation, and time) contributed 56.6% of the variation in incidence of CBB among cassava plants, soil infestation alone was not a significant contributor. Variations in shading contributed a major share of the variations (cf. 45, 3.7, and 1.0% unique contributions of shade, time, and soil infestation to the total sums of squares).

Movement of the bacteria in highly lignified tissue is very limited (Lozano 1973). It seems unlikely that direct penetration of the woody cutting by the bacteria from the soil and the subsequent infection of the young shoots occurs. Arene (1974) had earlier suggested that inoculum may be carried from the soil via rain splashes to young shoots where they initiate secondary

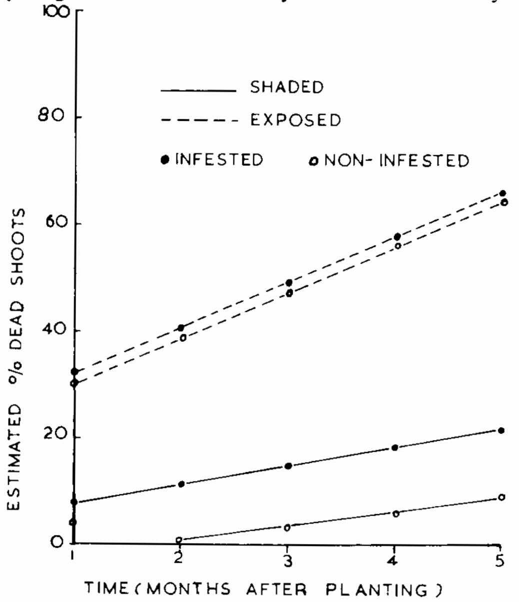

Fig. 1. Estimated percentage of diseased shoots at different time intervals after planting as affected by shading.

infection. We have also observed this, where the shading of the soil surface reduced CBB infection and consequently, incidence. The melon reduced the impact of raindrops and hence the height of the splashes whereas the maize served as a sideshield from raindrops and splashes. Therefore, CBB incidence was lower in the intercropped plots than in the plots cropped with cassava alone.

Acknowledgments

I thank Dr S.O. Odurukwe for guidance in computing the statistics and for his critical suggestions in preparing the manuscript, and Dr B.E. Onochie, Director, NRRI Umudike, for providing the facilities and for permission to present this work.

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