

Studies on the Black Spot disease of *Corchorus Olitorius* L.

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Abstract

The black spot disease is reported on a popular Nigeria local vegetable, *Corchorus olitorius* L. The *Curvularia* State of *Cochliobolus geniculatus* Nelson was confirmed as the causal organism of the disease.

Four commonly grown cultivars of the vegetable were tested in the field for their reaction to the disease, Yaya and Angbadu were found to be more susceptible than Ex-Ogbomoso and Igbalode. All severely infected leaves were rendered unmarketable.

Introduction

Corchorus olitorius (Ewedu) is a popular leaf vegetable grown mainly for its leaves that are eaten in the South-Western States of Nigeria (Epenhuijsen, 1974).

It can be grown all the year round and it is a cheap source of minerals, proteins and vitamins (Abaelu 1975, Oyenuga 1968, Oyenuga and Fetuga, 1975 and Oke, 1966).

Odebunmi Osikanlu (1977) reported the black spot disease among the diseases affecting this plant. This disease has been observed to occur on this vegetable in Ogun, Ondo and Oyo States of Nigeria and there are indications that it occurs also on the vegetable in Kwara, Lagos and Bendel States, (Odebunmi — Osikanlu, Unpublished).

This paper reports the study of the black spot disease on *Corchorus olitorius*, describes the disease, the isolation, identification of the organism associated with it and proof of pathogenicity of the organism.

The reactions of four commonly grown cultivars of the vegetable to the disease in the field is reported and discussed.

Materials and Methods

Isolation of the fungus

Infected leaf samples were collected from the field and taken to the laboratory for microscopic examinations. The leaf samples were washed free of soil under running tap water. Pieces of tissue (4mm²) were cut from infection areas, surface sterilised with 0.5% sodium hypochlorite solution for 3 minutes, rinsed in sterile distilled water and plated out on potato dextrose agar.

Ten isolations were attempted from each leaf sample and at least 4 samples were collected from each plot. After incubation at room temperature for 5 days, and mycelial colonies which had grown from out ends of the leaf pieces were sub-cultured and left to incubate and sporulate.

Each sub-culture was examined under the microscope. A culture of the consistently isolated fungus was sent to the Commonwealth Mycological Institute for final identification.

Pathogenicity tests:

Pathogenicity tests were conducted in the glasshouses on one cultivar, Yaya-Oniyaya: Surface sterilised seeds were sown in plastic plots (12cm in diameter) containing sterilised top soil. The pots were arranged in a randomised block design in the glasshouse.

Plant population was reduced to three per pot and there were twenty-four pots.

Inoculum was prepared from 10 day old cultivars of the *Curvularia* sp. by transferring the contents of a sporulating culture in petridishes into beakers containing sterile distilled water. The mixture was homogenised using a warring blender and filtered through double layered cheese cloth.

Plants in twelve pots were sprayed with sterile distilled water while the plants in the other twelve pots were sprayed with the spore suspension till run off. Plants in the pots were covered with polythene bags 30cm x 50cm to provide a humid environment for the plants. The polythene bags were tied to the pots after watering the soil in the pots. The bags were removed 48 hours after inoculation. Disease incidence was observed and recorded.

Reaction of four cultivars to inoculation with curvularia sp: Corchorus olitorius, Cultivars, viz, Agbadu, Igbalode, Ex-Ogbomoso and Yaya-Oniyaya were tested.

Angbodu is a broad - leafed, early maturing cultivar with smooth edged leaf blades. It is a high yielding cultivar with leaves of a deeper green than those of other cultivars. Igbalode is a long narrow — leafed, early maturing cultivar also with smooth edged blades and high yielding.

Ex-Ogbomoso has small leaves which are almost oval in shape and are glossy light green in colour. It is a late maturing cultivar.

Yaya-Oniyaya is a large - leafed cultivar with blades having sharply serated edges. It is a early maturing cultivar and high yielding.

Seeds were pre-treated by employing dry heat at 80°C for one hour and left to cool to room temperature to encourage rapid and uniform germination (Olusuyi 1976). Both the wet and dry season plantings were sown out in the field at Ikenne crop research station on 3m x 5m beds with four replications.

Early season planting was done in April while late season cropping was in July. Plants were watered as required while farm yard manure was applied as fertilizer prior to planting.

Plots were weeded twice during the wet season planting and only one weeding was done during the dry season cropping.

Insect attack was controlled by spraying with Vetox 85a WP (A.i. carbaxryl) at the rate of 28g to 9 litres of water and applied weekly.

Disease incidence was assessed as the era of leaf surface infected. Data were taken at fortnight intervals on a 0-5 scale. 0 being healthy and 5 severely infected. Disease intensity was assessed as the average number of severely infected plants per plot, only leaves with over 50a of the entire surface covered in spots were counted (Table 1). The number of every infected leaves per plant was then recorded. The plants were left to fruit for seed collection.

Results

Disease and Fungus Isolated:

In the field, black lesions occurred on leaves and in some cases the spots coalesced to produce larger spots. On young leaves, the spots were round black. The fungus isolated from the samples was identified as the *Curvularia* state of *Cochliobolus geniculatus* Nelson. Observations in the field showed clearly that the black spot disease occurs all the year round.

Pathogenicity

Leaves of *Corchorus olitorius* which are inoculated with the spores of the *Curvularia*, sp. started to show symptoms of infection four days after inoculation.

Symptoms started as a brown spot of about one milli-metre in diameter. Five days later, a brownish black necrotic spot occupied the centre of the lesion.

In two to three days, a brown circle which was surrounded by chlorophyll clearing was formed around the spot. The brown spots gradually enlarged to about 3 — 4mm necrotic areas. In severe cases, many of the necrotic areas coalesced to form large areas to eventually cover the leaf surface and kill the leaf.

Reaction of four Cultivars

All four cultivars were infected by the fungus but Angbadu and Yaya-Oniyaya were found to be more susceptible to the disease than the other two with an average disease incidence score of 3 and 2 respectively. Also disease intensity ratings of 7.5 and 8.5 infected leaves per plant respectively in the early season (Tables 1&2). Igbalode and Ex-Ogbomoso were least affected by the disease with the disease incidence of 1.1 and 0.6; and disease intensity ratings of 3.5 and 2.5 infected leaves per plant respectively.

The dry season planting was found to produce smaller leaves on plants which grew much more slowly than the wet season planting due to weather factors.

The results show that more severe infections of the disease were obtained in the late season (Tables 1 and 2)

TABLE 1: INCIDENCE OF THE BLACK SPOT DISEASE ON FOUR CULTIVARS OF *CORCHORUS OLITORIUS* IN THE EARLY AND LATE CROPPING SEASONS FOR 1979 AND 1980

	Early		Late	
	1979	1980	1979	1980
Yaya	3.0	3.0a	4.0a	3.5a
Igbalode	1.0b	1.2b	2.0b	1.5b
Angbadu	2.0a	2.0a	3.0a	2.5a
Ex-Ogbomoso	0.5b	0.7b	1.0b	1.0b

TABLE 2: INTENSITY OF THE BLACK DISEASE ON FOUR CULTIVARS OF *CORCHORUS OLITORIUS* IN THE EARLY AND LATE CROPPING SEASONS OF 1979 AND 1980.

	Early		Late	
	1979	1980	1979	1980
Yaya	8a	9a	14a	15a
Igbalode	3b	4b	8b	10b
Angbadu	7a	8a	13a	13b
Ex-Ogbomoso	2b	3b	7b	8b

Figures followed by same letters are not significantly different at 5a. Duncan's New Multiple Range Test.

Discussion

The results showed that the black spot disease was more of a problem in the dry season than the wet season production. This was probably because the rate of growth of the plant was faster in the wet than in the dry season when moisture stress slowed down growth, since watering was done only when considered necessary.

Therefore adequate and timely supply of irrigation water, would assist the plant to escape the disease during the dry season, as in the wet season.

The fungus associated with the disease has been reported to be the *Curvularia* State of *Cochliobolus geniculatus* Nelson since 1977 but was not tested for pathogenicity (Odebunmi - Osikanlu, 1977). This fungus has now been confirmed as the causal organism of the disease in this investigation.

The test carried out in the field provided a true effect of the disease on the plants under natural environment, particularly as the effects of wet and dry seasons have shown. Although the lack of water or rain in the dry season is the main cause of low yields, the incidence of disease can make the situation worse. This may explain the scarcity of the vegetable in the market during the dry season hence the high market price in the dry season.

It is interesting to note that the two more susceptible cultivars - Yaya and Angbadu are considered more palatable than the other two cultivars (Pers. commun). Therefore efforts should be made to prevent the occurrence of the disease at severe levels.

There is need however to determine the level of inoculum required for severe infections, the source of inoculum, effect on foliage and seed yield and the best control methods to be recommended. It can be recommended that the plant be grown in the wet seasons or under efficient irrigation system during the dry season.

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