CROP PROTECTION STRATEGIES FOR MAJOR DISEASES OF COCOA, COFFEE, CASHEW AND KOLA IN NIGERIA

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INTRODUCTION

• Cocoa Research Institute of Nigeria was established in 1964 and amongst its objectives is the identification of the ecology and methods of control of pests and diseases affecting her mandate crops which include; cocoa, cashew, coffee, tea and kola.

• Nigeria has witnessed a downward trend since early 1970’s due to numerous factors e.g ageing trees, shortcomings in applying recommended agronomic techniques by farmers, and the effects of pests and diseases (Okeniyi et al., 2009).
INTRODUCTION

• Disease is define as deviation from the normal healthy conditions; which is expressed in form of different symptoms, malformation, malfunction or total death of plant (Agrios, 2005).

• High crop yields can be achieved with sustainable agriculture if plants are protected from disease and pests which will make plant to grow well, take up nutrients, compete with weeds and yield to the limit of the environment (Adejumo, 2005).
Diseases of Cocoa

*Phytophthora* pod rot (Black pod)

Pod rot also known as black pod is caused by *Phytophthora* spp. (*P. palmivora*, *P. megakarya* and *P. capsici*).

*P. megakarya* is the most aggressive of the pod rot pathogen causing significant losses in favourable environment (ICCO, 2017).

**Symptoms**

- starts with a brown dots on the pod, which later expand and become black with whitish fungal spores on the entire pod.
- At the advance stage, the cocoa bean inside get damaged and black losing its quality.
Control

- Use of resistant varieties
- Protectant spray of copper based fungicides, combined with the systemic fungicides metalaxyl under high disease pressure, at three of four weekly intervals are frequently recommended
- Cultural control involves modification of farm management practices to optimize shade and aeration through appropriate spacing and pruning to reduce surface wetness should be effective
- Frequent and complete harvesting, sanitation and appropriate disposal of pod mummies, infected pods and pod husks can reduce the disease.
- The use of botanicals.
Cocoa Swollen Shoot Virus (CSSV)

CSSV are found only where trees are attacked simultaneously by mirids (capsid), Mealybugs including *Planococcoides njalensis*, *Ferrisiana virgata* and *P. citri* transmit the disease. Soil inhabiting nematodes have also been reported as active transmitting agents (Lana and Adegbola, 1977; Afolami, 1980).

**Symptoms**
- vein-banding, inter veinal chlorosis
- immature flush leaves
- leaf mosaic
- development of swelling of nodes, inter-nodes, apex of stems and root
- malformation in some of the pods produced by infected trees and in cases of severe virus attack
- death of infected trees.
Control

- The use of resistant varieties
- Rehabilitation of cocoa farms by eradicating/removal of infected trees. This is done by uprooting all the obviously infected trees and replanting with improved virus tolerant/resistant varieties.
- Control of carrier (mealy bug with insecticide).
Charcoal pod rot

The disease is caused by *Botryodiplodia theobromae*

**Symptoms**
It commences with brown marks, which are soft to touch. May cause up to 50% loss when serious.

**Control**
- Cultural control- by farm sanitation
- Chemical control – spray of fungicide
Root rot

The disease is caused either by *Armillaria mellea*, *Formes* spp and *Rosellinia* spp.

Symptoms
- Sudden withering of the foliage with vertical cracks and splits on the bark of the collar.
- Affects isolated cocoa trees and later spread to many trees in the plantation if not controlled immediately.

Control
- The affected trees should be cut and the stump should be poisoned with fungicides and if possible the diseased tree could be uprooted and the remains burnt outside the plantation.
Cashew
(*Anacardium occidentale*)

**Inflorescence Blight**

The disease is caused by a fungus *Lasiodiplodia theobromae* causing 40-45% crop loss annually.

**Symptoms**

- withering of petals and other parts of the flower,
- progressive die-back of the small peduncles from the tip downward to the main flora shoots.
- The insect (*Heliopethis antonii*) first inflict wound on the susceptible plant.
- immature nut and apples were infected they become black and fluffy.

**Control**

Spraying the combination of insecticide and fungicide. (A spray program consisting of a pre-bloom and after bloom application). Proper weeding and removal of alternate host like tree that can provide abode for the vector.
Twig die-back

The causal organism is *Lasiodiplodia theobromae*.

**Symptom**
- withering of cashew twigs
- followed by a progressive die-back of shoot as the twigs turn dark brown causing abscissions of the vegetative part.
- The fungus penetrates into deeper tissues and causes the death of the shoot from the tip downward.

**Control**
The disease is best controlled by a combination of approaches including cultural, resistance and use of fungicides. Removal and burning of all infected organs before the start of cashew season.
Pseudo-apple Spot

The disease is caused by *Colletotrichum gloeosporiodes* Penz.
The disease is more important after rainfall and fruiting period.
Dispersal mechanism is basically the rain splash and free running water.

Symptoms
After fruit setting, infection of older nuts results in characteristic ‘tar spot’ like lesion on the Pseudo apple.

Control
Planting resistant varieties
Use of fungicides
Cultural practices.
Cashew Leaf rust

Caused by *Cephaleuros virescens*

**Symptoms**
The disease symptoms on leaves show patches with brownish colour. Lesion subsequently multiplied, covering the entire leaf.

**Control**
Combination of approaches including cultural and use of fungicides
Disease of Coffee
Coffee Leaf Rust

Coffee leaf rust (CLR), caused by the fungus *Hemileia vastatrix*. It is the most important disease of *Coffea arabica*, the most susceptible of the three coffee species, and affects both yield quality and quantity.

**Symptom**
Yellow to orange powdery spots appear on the underside of leaves, with corresponding chlorotic patches on the upper side.

**Control**
- Use of resistant varieties
- Cultural practices
- Integrated Pest Management
Coffee Leaf blight
Caused by *Cercospora coffeicola*

Symptoms
- begin as a necrotic spotting of young leaves that expands to form brown leaf lesions covering much of the lamina.
- Older lesions exhibit round, black pycnidia in the necrotic tissue,
- the disease develops into a general blight of young shoots; affected shoots appearing brown and scorched.

Control
- Use of resistant varieties
- Cultural practices
- Integrated Pest Management
Coffee Berry Disease
caused by *Colletotrichum gloeosporiodes*

**Symptoms**
- development of small, water-soaked lesions on young, expanding berries that rapidly become necrotic, dark brown or black and slightly sunken spots.
- Later enlarge to cover the whole berry within about a week, which eventually rots
- Lesions may also occur on young berry stalks, causing them to be shed before lesions appear on the berry itself

**Control**
- Use of resistant varieties
- Cultural practices
- Integrated Pest Management
Cola
Fruit and seeds diseases

wet rots
The disease is caused by various fungi especially *Botryodiplodia theobromae* Pat. and *Fusarium* and *Penicillium* species.

**Symptom**
- Kola nuts stored in baskets lined with fresh leaves at a high temperature and high humidity provokes development of various parasitic fungi, especially
- infest the follicles, which develop a black rot and subsequently affecting the nuts.
- development of rusty brown spots on the nuts, which later turn black and become hard and dry.
- tissues fall out, living small pits in the surface.
Black, hard rot and pink soft rot

Caused by *Aspergillus niger*.

**Symptoms**
The rate of development of fungi actively growing on nuts of *C. nitida* depended more on the ambient relative humidity than on nut moisture content.
The principal postharvest pathogens were found to be *Botryodiplodia theobromae* and *Fusarium* spp.

**Control**
- Milton (1% sodium hypochlorite) sol. was slightly fungicidal at 0.5 and 0.75% and highly so at 0.95 and 1%, depending on exposure period.
- Substantial reduction postharvest rot (particularly in nuts stored in baskets lined with polyethylene sheet over banana leaves) was achieved when the nuts were soaked in 1% Milton for 30 min before storage.
- Milton solution and Ash treatments @ 3kg of kolanut
- Storing the kola nuts at the appropriate temperature and relative humidity could prevent
Leaves and twigs disease of Kola

Leaf disease is very common in young leaves and usually occurs in the latter part of the rainy season, seriously affecting many of kola shoots, and leaving them leafless.

- **Phomopsis species**, Causes tip die-back. Infected leaves turn brown, and start to die back from the tip to the petiole and from the margin to the midribs before they finally drop.

- **Guignardia citricarpa Keily** is associated with yellow or orange discoloration of leaves while

- **Botryodiplodia theobromae** causes a twig blight and a brown coloured blight of leaves.

- **Glomerella cingulata** causes greenish spots with a mouldy appearance on kola leaves (Oludemokun, 1979).
Roots disease of Kola

In nurseries, seedlings are often infected with fungal diseases. Common among them are

*Botryodiplodia theobromae* and *Fusarium* species

**Symptoms**

- cause the roots of the infected seedling to rot and turn their leaves brown.
- In the field, infected roots often cause yellowing of leaves before eventually killing the plant.

**Control**

Aldrex T, pesticides containing 25% aldrin and 50% thiram.
Conclusion

Tree crops especially cocoa, cashew, coffee and kola are very important as saving alternatives to petroleum in Nigeria economy.

Nigeria was initially dependent on the tree crops and they remain the only veritable alternatives especially now that the dwindling price of crude oil has brought recession to Nigeria, to achieve this the various diseases should be adequately managed and control.
THANK YOU FOR LISTENING