

RESISTANCE BY DEFENSE: In case the resistance by protection fails and the pathogen succeed in entering the plant tissue, resistance by defense may develop whereby a dynamic mechanism set in to defend the host.

AGGRESIVENESS

This is the capability of the pathogen or the virus to infect a host pathogen. The term is used particularly in a gradual sense and is measured by the degree of infection. However, the degree of infection is also determined by the susceptibility or resistance of the host.

SUSCEPTIBILITY

This is the inability of the host to prevent the development of the parasite thus not defending itself against infection by a pathogenic organism or virus.

VIRULENCE

Virulence is the observed capacity of a pathogen to infect certain genotypes of a host plant.. In reference to genotypes which cannot be infected, the term avirulence is used.

The term pathogenicity indicates in general the disease generating capacity of biotical and abiotical factors.

A parasite is not regarded to be a pathogen if it lacks virulence.

VULNERABILITY

This is the inability of the host to defend itself against infection by parasite or infestation by phytophages.

MAIN CATEGORIES OF PLANT DISEASES

As to the cause of the malfunctioning of processes in plants, a distinction can be made between infections and non-infections diseases.

INFECTIOUS DISEASE: are caused by pathogenic organisms. Pathogens include parasitic fungi, bacteria and protozoan as well as mycoplasmas and viruses.

NON INFECTIOUS DISEASES: are malfunctioning caused by hereditary and genetic defect. Abiotic factor causing diseases include adverse soil conditions, deficiency or excess of certain nutrients, adverse meteorological conditions, environmental pollution and industrial contaminant.

ESTABLISHMENT OF PLANT DISEASES

In order to establish the host – pathogen relationship, the pathogen must first arrive at the surface of host then followed by the penetration of the host, then development of the organ like a germ – tube of a germinating spore usually during this stage, there are no visible symptoms and the period referred to as membation stage which may in turn lead to the on

ward recognition of the first symptom as the host gets infected. The relationship may not reach or pass the incubation stage of the host since plants put up effective resistance either by protection or defense.

For a conclusion to be made about the causative agent of a particular disease, some steps need to be taken and this is because though an organ may be present or in association with the lesion, it does not necessarily mean that it caused the disease because there could be the secondary invader. In 1884, Koch laid down some conditions to be fulfilled before an organism can be confirmed as the causative organ.

KOCH POSTULATE

1. The organism must be consistently associated with the lesion of the disease.
2. The organism must be isolated and grown in pure culture, free from all other organisms.
3. The organism from pure culture must be inoculated on to healthy plants of the same species from which it was originally isolated and must reproduce the same disease as was originally observed.
4. The organism must be re-isolated and re-inoculated and must once again reproduce the original disease. In case of an obligate pathogen, inoculation is onto a healthy host.

PLANT DISEASE DIAGNOSIS

The diagnosis of pathogen diseases is one of the most important and useful techniques to be learnt in pathogen pathology. To diagnose a plant disease successfully, the characteristics of the organism that caused the disease or symptoms and signs associated with the major type of diseases and the test to confirm the organism and the basis for classification of that pathogen needs to be understood. Plant disease diagnosis is designed to recognize the primary disease causing agent. The majority of pathogen diseases can be diagnosed by a relatively straightforward procedure, an evaluation of background information and a macroscopic and often microscopic examination of the diseased pathogen. However, some diseases can only be diagnosed currently through the use of sophisticated tools such as serology.

STEPS IN DISEASE DIAGNOSIS

1. Obtain background information on host and disease.
2. Obtain a good sample of diseased plant.
3. Examine pathogen and describe symptoms and signs of disease.
4. Obtain literature describing diseases for the host.
5. Identify disease by accompanying your description of disease with published descriptions.

PESTICIDES

Pesticides have played and will continue to play a great role in increasing agricultural production and in securing the supply of food and fibres needed by the people of the world. It is essential that the reasons for using pesticides and the consequences of mis-using them be carefully analysed in order to obtain maximum benefit from their application while at the same time, preventing their possible hazardous effect on non target organism and the environment.

ADVANTAGES OF CHEMICAL CONTROL

1. It is an effective and reliable means for controlling pests and diseases and preventing losses in fields and in storing.
2. They offer protection against many diseases
3. Most pesticides demonstrate fast activities by which serious infection and outbreaks can be limited or possibly controlled.
4. Chemical control is effective under very diverse ecological conditions and it is less dependent on scale of the operation than the various forms of cultural and biological control.

DISADVANTAGES OF CHEMICAL CONTROL

1. Many pesticides cause the development of resistance in organisms
2. Pesticides having a persistent activity may destroy the natural enemy complex.
3. Improper application of pesticides may cause unwanted or hazardous effects with regards to specific sensitivity of the target organism and natural enemies,
4. Cost of pesticide is rising steadily.
5. The inherent toxicity of pesticides and the long persistence cause environmental contamination.

INTEGRATED PEST MANAGEMENT (IPM)

IPM has been defined as a pest management system that in the context of the associated environment to the population dynamics of the pest species, utilizes all suitable techniques and methods in as compactable a manner as possible and maintains the pest population at levels below those causing economic injury.

ECONOMICALLY IMPORTANT CROP

Cocoa is one of the most important cash crops grown by farmers in central and West Africa.

ECONOMIC IMPORTANCE OF COCOA

It is a perennial crop which may yield for up to 30 years and all the parts of the plant have one use or the other but the most important of them is the fruit (pod). Cocoa has been used as sources of chocolate and various chocolate based products. The cocoa powder is used in making cakes, biscuits, bread, bournvita, ice cream etc. The cocoa bean also serves as a source of wine. The fruit wall is fibrous and is used in soap making. The leaves of cocoa are locally used for wrapping fruit and when they drop

from the tree, they serve as a good organic manure. The stem is locally used for firewood.

DISEASES OF COCOA

(1) Black pod (fungi)

This has been the primary fungal disease affecting cocoa production worldwide since the 1920's. A detailed study of the taxonomy of the species of phytophthora affecting cocoa proposed 3 species *Phytophthora palmivora*, *Phytophthora megakarya* and a third species, tentatively identified as *Phytophthora capsici*. This latter species closely resembles black pepper fungus *Phytophthora capsici* but it might prove to be a new species.

Phytophthora palmivora has a worldwide distribution on cocoa *Phytophthora megakarya* is confined to several countries of West Africa and *Phytophthora capsici* to South America, central America and the west Indies.

The major economic loss is from infection of the pod. Economic loss arises from infection during the 2 months prior to ripening. Pods infected at this stage can be a total loss because the fungus can easily pass from the pod husk to the coat of bean in a developing green pod.

CONTROL MEASURES.

CHEMICAL CONTROL OF BLACK POD.

Chemical control of black pod by spraying copper fungicide is a well established control of black pod.

CULTURAL PRACTICES

Cultural control forms an important part for Phytophthora pod rot management in Cameroon. This method is based on the reduction of relative humidity and the quantity of the inoculum in Cocoa farms. Achieving this objective in Cameroon include regular weeding, pruning of cocoa trees, sanitation and shade management in cocoa farms.