

PRACTICAL NO 12

PLANT DISEASE DIAGNOSTIC TECHNIQUES: STUDY OF SYMPTOMATOLOGY (SYMPTOMS, SIGN, SYNDROME, INFECTIOUS AND NON INFECTIOUS DISEASES)

This topic is a practical introduction to symptomatology with an outlook to prepare for diagnostic work.

Plant disease diagnosis is the identification of nature and cause of diseases based on signs and symptoms. Identification of symptoms and signs and comparative symptomologies of infectious and non infectious diseases are considered to be most essential for diagnosis of a unknown plant diseases. The presence of the pathogens or various structures viz., mycelium, sclerotia, sporophores and spores produced on the surface of the host are called signs whereas symptoms refer to only to the appearance of infected plants or plant tissues.

Diagnosis of a plant disease is one of the most important and useful techniques in plant pathology and familiarity with the basic classification of plant diseases, the characteristics of organisms that cause a particular diseases, the symptoms and signs associated with different types of disease is a pre-requisite to diagnose a plant disease. Majority of plant diseases can be diagnosed by a relatively straight-forward procedure involving an evaluation of background information and a macroscopic and often microscopic examination of diseases plant. However, some diseases can be diagnosed correctly through the use of electron microscope and serology. A majority of abiotic and biotic factors may cause similar disease symptoms and the best proof that a particular organism is the cause of disease is fulfilment of Koch's postulates. Koch's postulates are performed infrequently, except when the disease agent is suspected to be new and previously unreported. Most of the plant disease diagnoses done today involve identification of plant diseases that have been previously described and named. Several techniques may be performed to determine the identity of diseases. Visual studies of symptoms and signs, microscopy, culture media studies and serology techniques are the most frequently used techniques in diagnostic clinics.

Identification of nature of a disease

In determination of a plant disease the first step is to determine the infectious and non infectious nature of the disease.

Infectious diseases

An infectious disease will spread to other plants in the field by various means and is characterized by the presence of pathogens on the surface of the plants or inside the plant. In diseases caused by pathogens viz., fungi, bacteria, nematodes, viruses, mollicutes, a few or large numbers of these pathogens may be present on the surface of the plants or inside the plants. The presence of such pathogens in an active state on the surface of a plant indicates that they are probably the cause of the diseases. Their detection and identification can be determined with the experienced naked eye or with a magnifying lens and if no such pathogens are present on the surface of a diseased plants then it will be necessary to look for additional symptoms, especially for pathogens inside the diseased plant. Such pathogens are usually at the margins of the affected tissues, in vascular tissues or at the base of the plant or roots. Certain infectious

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pathogens like viruses are neither seen nor can be grown on artificial media. They produce symptoms similar to those resulting from nutritional deficiencies.