Chapter III

HISTORY OF PLANT PATHOLOGY DEFINITION OF PLANT DISEASE

(Histoire De La Pathologie Végétale Définition De La Maladie Des Plantes)

III.1. What is Plant Pathology?

Plants, like animals and humans, can also become diseased. In fact, there is a much wider number of plant diseases than there are human or animal diseases simply because there are more plant species involved in agriculture, horticulture and forestry than in medical or veterinary medicine.

The science of plant diseases is called plant pathology, or phytopathology. There are a wide variety of microorganisms such as fungi, bacteria, viruses and nematodes that cause these diseases. Diseases caused by these pathogens are often called biotic diseases. Also, environmental conditions, such as winter damage or drought stress, can cause disease in plants. Diseases caused by these factors are often called abiotic diseases.

Plant pathologists are responsible for studying plant diseases, and their studies include various aspects of plant diseases, such as the organisms and environmental conditions that cause disease in plants, the mechanisms by which these factors cause disease, the interactions between these causal agents and the plant, and methods for managing or controlling plant diseases.

The science of plant pathology is closely allied with other sciences such as botany, mycology, microbiology, genetics, chemistry, horticulture, agronomy, and soil science. Plant pathologists integrate and use information from many of these sciences to develop insights into disease development and disease control.

III.2. Why is Plant Pathology Important?

Farmers rely on plant pathologists for advice on disease-management strategies so they can produce a reliable, high quality crop.

III.3. Historical Effects of Plant Disease

Famine! Shortages of food severe enough to result in starvation are rare today but famine was a common enough occurrence in the past. For example, there are many biblical references to famine, and good

evidence to suggest that many of these famines were the result of devastating epidemics of plant disease. Over two thousand years ago, the Greek philosopher Theophrastus studied (no doubt because of effects on supply and price of food) cereal and legume diseases.

One of the most infamous human disasters resulting from destruction of food supplies by plant pathogens is the Irish Potato Famine.

III.4. What Causes Plant Disease?

Pathogens like bacteria, fungi, nematodes, viruses, and phytoplasmas, as well as abiotic problems, can all cause plant diseases.

III.4.1. Abiotic problems

are caused by adverse extremes in the environment, such as nutrient deficiency, prolonged water stress, and air pollution.

Some bacterial diseases, like bacterial wilt (above), affect the phloem of plants, clogging the tubes that move water and nutrients

III.4.1.1. Bacteria

Are single-celled organisms with no nucleus. Most bacteria associated with plants are saprophytic (feed on dead organic debris) and do no harm to plants. But a few--around 100 species--can cause plant diseases (Jackson 2009).

Under favorable conditions, they reproduce very quickly, some doubling their population in just 9.8 minutes (Eagon 1972). Bacteria can cause blights, leaf spots. They typically enter the plant through natural openings, or wounds created by wind-swept sand, hail, heavy rain, and/or mechanical damage. They can be spread by infected seed or from plant to plant by water splashing, insects, and humans.

III.4.1.2. Fungi

Usually grow as threads. It’s can be only a few inches long or miles long. Mushrooms are one type of fruiting body that some fungi form to reproduce. Fungi reproduce via the production of spores. These spores may be spread long distances by air or water, or they may be soilborne. Certain fungi are also able to produce structures that enable them to survive in the soil for many years. They can cause root and stem rots, shoot and leaf blights, leaf spots, cankers, vascular wilts, and postharvest storage rots (Agrios 1997).

Glossary:

Pathology: (gr., path -"suffering"- **"logy",** the science of) is the study of plant diseases and the abnormal conditions that constitute plant disorder

A plant disease: is an abnormality in the structure and/or function of the host plant cells and/or tissue as a result of a continuous irritation caused by a pathogenic agent or an environmental factor

Biotic (a living component of an ecosystem)

Abiotic (non-living, physical and/or chemical component)

Botany: the scientific study of plants, including their physiology, structure, genetics, ecology, distribution, classification, and economic importance.

Mycology: the scientific study of fungi

Microbiology: the branch of science that deals (traite) with microorganisms.

Abnormal = anomalie (اضطراب)

Cells = la cellule

Pathogenic agent = agent pathogène

Environmental factor = facteur environnemental

Irritation = (للتهيج)

Fungi = les champignons

nematodes = les nematodes (الديدان الخيطية)

Drought = la sécheresse

Biotic = biotique (Relatif au monde vivant)

Abiotic = Abiotique (Se dit d'un facteur lié au milieu, indépendant des êtres vivants)

Shortages = Pénuries

Starvation = la famine

Phytoplasma = Phytoplasmas are obligate intracellular parasites of plant phloem tissue and of the insect vectors that are involved in their plant-to-plant

Nutrient deficiency = carence en nutriments

Wilt = flétrissement

Mushrooms = Les champignons

Spores : Typically one-celled, reproductive unit capable of giving rise to a new individual without sexual fusion, characteristic of lower plants, fungi, and protozoans.