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ANALYSIS OF PLANT PATHOLOGY AND PLANT DISEASES

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ABSTRACT

More and more diseases are being found to be caused by bacteria, fungi, and viruses in recent years. A variety of stages in the agricultural production process are affected by infections. According to weather conditions and crop phytosanitary conditions, the prevalence of diseases can reach 70–80 % plant population, and the yield can fall as low as 80–98 % in some cases. Certain phytopathogens are able to evade the inherent cellular immunity of plants. A wide variety of microorganisms can cause plant disease, including nematodes, fungi, bacteria, and mycoplasmas, among others. The fact that nucleic acid and protein make up the nucleic acid and protein of viruses and viroids places them in the same category as biotic agents. Some seed-bearing higher plants are pathogens because they feed off the plants they parasitize. Pathogen biology can be thought of as a series of interconnected stages, such as dormancy, reproduction, dispersal, and pathogenesis, that occur within the life cycle of a pathogen. The host, pathogen, and environment interact in a series of interactions that determine the progression through these stages. Many plant disease prediction models are based on the progression of the disease cycle. For the majority of plant disease prediction systems, temperature and moisture play a key role.

KEY WORD: *bacteria, fungi, viruses, pesticides, phytopathogen.*

INTRODUCTION

Fungi, bacteria, viruses, nematodes, and other microbes that infect plants are the focus of plant pathology, a field within agricultural science. When plants get sick or are otherwise afflicted, they suffer, die, or lose their ability to reproduce. Plant disease refers to any abnormal condition that affects a plant's appearance or functionality. It is from the Greek words "pathos" and "logos" that the term "Pathology" was coined. The act of learning or studying. Therefore, pathology is the study of pain. A branch of biology that studies plants that are infected with pathogens is called Plant Pathology or Phytopathology (Gr. Phyton=plant). Treatment of disease is an art form that is inextricably intertwined with scientific investigation into its causes. Aside from identifying pathogens, pathosystem genetics, disease etiopathogenesis, disease recurrence, economic impact, epidemiology of plant diseases, plant disease resistance, and how plant diseases affect humans and animals, plant pathology encompasses a wide range of topics. Additionally, it integrates information from a variety of other scientific disciplines, such as mycology, microbiology, virology, biochemistry, and bioinformatics. Plant pathology has a direct impact on human civilization's ability to produce food and fibre. Plant Diseases and Plant Pathology: Major advances in plant-pathogen interactions, the classification of plant pathogens, and methods for controlling or managing

disease are addressed in this book Is of interest to a global audience because it discusses a wide range of diseases that affect people all over the world.

In the majority of cases, plant pathologists devote their time to focusing on just a few of the thousands of diseases that affect crops. It is possible to target the pathogen's alternate host as part of a disease eradication effort, but this is not always the case (the infectious agent frequently survives the intercrop period on a totally unrelated host, the alternate host). The pathogen's survival is threatened if this host is eliminated. Ribes spp. removal to control White Pine Blister rust or barberry removal to control black stem rust in wheat are two examples of this. Plant disease can be effectively controlled by removing and burning the affected parts.

PLANT DISEASE

Term used to describe any abnormal condition that affects the appearance or performance of a plant. Some or all of the plant's functions are impacted by this physiological process. Disease can also reduce the harvest's yield and quality. The study of plant diseases is critical because they can harm both the plant and its products.. Losses can occur in the field, in storage, or at any point between the planting and harvesting phases. Material and financial losses are directly linked to the diseases. More than a billion people are still harmed each year by plant diseases, which reduce crop yields by 14% and cost the economy 220 billion dollars. S. dollars. There is evidence that plants were infected with various diseases 250 million years ago, according to fossil evidence. Many historical events have been linked to plant disease. All plant species, wild and cultivated, are vulnerable to disease. Each species has its own unique set of infectious diseases, but these tend to be rare. Pests and pathogens, as well as the crops and varieties grown, all play a role in the frequency and severity of plant diseases, which can change from season to season.

IDENTIFY AND TREAT PLANT DISEASE

Learn to identify the symptoms of debilitating diseases in your plants and take preventative measures. More disease-resistant plants have better health. Diseases of plants thrive in the Fraser Valley's cool, moist weather in spring and fall. To prevent the spread of disease, place plants in a way that ensures good air circulation around them. Disease control products currently on the market are all preventatives, which means they must be used before the problem occurs. Identifying the pathogen is the first step in a holistic approach. Then, choose a treatment method that is safe, effective, and responsible for your health.

A Blemish on The Skin

In addition to roses, black spot can be found on a variety of other ornamental and garden plants. Black, round spots appear on the upper sides of leaves as a result of this fungus. Infected leaves on the lower stems usually appear first. Toxic infestations cause the plant's infected leaves to turn yellow and fall off. During prolonged periods of wet weather or when leaves are wet for more than six hours, black spot is a problem. The spores of black spot can be found in the leaves that have fallen.

In addition, there are other leaf stains.

Indoors on houseplants and outdoors on landscapes, fungus leaf spot disease can be found. This happens when it's humid and warm outside. The fungi become so large that they begin to rub against one another as the disease progresses and spreads throughout the body. There are more blotches than spots on the leaf at this point. Defoliation of a plant is possible as a result of leaf spot.

Mildew on Paper

Plants, flowers, vegetables, and fruits are all susceptible to powdery mildew because it is a fungal disease. Identification of powdery mildew is straightforward. Plants that have been infected will have a white powdery substance on their upper leaf surfaces, but it can also appear on their stems, flower buds,

and even their fruit. Low soil moisture and high humidity levels on the plant's upper surface favour the growth of this fungus. In general, plants kept in shade suffer less damage than those in full sunlight.

Anthracnose

It's critical to know the difference between downy and powdery mildews because they have different life cycles. White powdery substance on the upper leaves of the plant is caused by powdery mildews, which are true fungal pathogens. On the other hand, downy mildews, which are more closely related to algae, produce spores that have a greyish fuzzy appearance on the undersides of leaves. Look for spots of pale green or yellow on the upper surfaces of older leaves to identify downy mildew. On the lower surfaces, the fungus will display a white to greyish, cotton-like downy substance. Temperatures in the early spring and late fall are ideal for the growth of downy mildew. Temperatures below 65°F and high relative humidity are ideal for spore production.

Blight

The disease of plant blight is quite common. During the potato famine of the 1840s, remember? One million people died as a direct result of the blight. However, blight can affect a wide range of plants in addition to potatoes, most notably tomatoes. Wind-borne spores spread the fungus known as blight. As a result, spores are able to quickly spread the infection over large areas. When the temperature is above 50 degrees Fahrenheit for two consecutive days and the humidity is above 90% for eleven hours or more, blight can spread rapidly. There is no remedy. The only option is prevention.

Canker

When a fungal or bacterial pathogen has infected an open wound, it's easy to tell if you have canker. Cankers can range in severity from the non-fatal to the deadly. Landscape woody plants are the most commonly affected by canker. Sunken, swollen, cracked, or dead areas on stems, limbs, or the trunk may be symptoms. Cankers can encircle limbs and kill vegetation. Cold, insects, drought, nutritional deficiencies, or root rot are the most common causes of plant stress that results in cankers. The pathogens can be spread by rodents as well.

Hole in the Wall

Interior British Columbians call Shot Hole Coryneum Blight. Fruits such as peaches and apricots are infected by this disease when they are exposed to warm, wet weather conditions (not large branches). Shooting holes appear on the leaves due to numerous small tan to purplish spots that fall out. Red to purple spots can also appear on the fruit, which can be accompanied by a clear, gummy material. On smaller branches, cankers are also common.

Causes Of Plant Diseases

The following are broad categories into which plant disease-causing agents can be placed:

1. Animate or biotic causes: The following groups comprise pathogens found in nature.
(i) First, there's the fungus. (ii) Bacteria (iii) Phytoplasma (iv) The organisms that resemble Rickettsia (v) Algae (vi)Phanerogams (vii) Insects and parasites (viii) nectar-sucking nematodes

MesobioticCauses :

Neither living nor non-living organisms are to blame for the spread of this disease, e.g. (i) Viruses (ii) Viroides

In animate or abiotic causes: To put it another way, these factors have a direct impact on plant health rather than on the crops themselves.

instead of infecting others. Reasons for this:

(i) Deficits or excesses in nutrients can occur. (ii) In addition to light (iii) moisture (iv) A fourth factor that affects temperature is (v) pollution in the air (vi) Lack of oxygen (vii) Toxicology of pesticides is (viii) Improper cultural practices (ix) Unusual characteristics of the soil

REVIEW OF LITERATURE

J.F. Dastur (1886-1971), a Butler colleague who pioneered detailed studies of plant pathogens and fungi, was the first Indian Plant Athologist. The castor and potato diseases he studied were caused by the Phytophthora genus, which he studied in depth. His discovery of Phytophthora parasitica in castor oil made him famous around the world.

The use of resistant cultivars for clubroot control has been recommended as one of the most effective methods (Donald & Porter, 2009). (Diederichsen et al., 2009). A better understanding of the mechanisms of pathogenesis is necessary for breeding for resistance. Even though many aspects of the pathogenesis of P. brassicae have yet to be clarified (Hwang et al., 2012), one is the relative importance of primary and secondary infections in clubroot establishment, or to put it another way, the pathogenicity of P. brassicae's zoospores as primary and secondary.

OBJECTIVES

- Research into the causes, signs, symptoms, risk factors, and recurrence of such illnesses.
- Plant pathology has a much broader scope than human pathology, which only deals with one aspect of plant disease i.e. plant pathology.health.
- It is the goal of this branch to better understand how pathogens, hosts, and environments interact to cause plant disease and to devise strategies for combating it.

RESEARCH METHODOLOGY

Direct and indirect methods can be used to detect and identify plant diseases. For high-throughput analysis of large numbers of samples, direct detection of diseases includes molecular and serological methods. The pathogens that cause disease, such as bacteria, fungi, and viruses, are detected directly using these methods, allowing for precise disease/pathogen identification. Other parameters such as changes in plant form and structure, temperature, transpiration rate, and volatile organic compounds released by infected plants can be used to indirectly detect disease in plants.

RESULT AND DISCUSSION

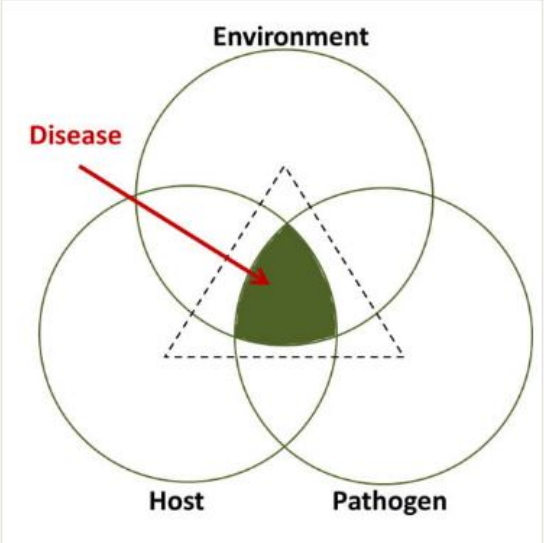
Disease Triangle

In order for a disease to occur, there must be three components.

with regard to any type of plant. The following are the three main factors to take into consideration:

- a plant that is easily infected
- a lethal disease agent
- environment that is conducive

These three components must all be present at the same time in order for a disease (shaded region) to occur, which can be represented by the shaded portion of the diagram above. This concept is illustrated by the shaded portion. An increase in overlap (as the shaded area gets bigger) indicates an increase in disease.

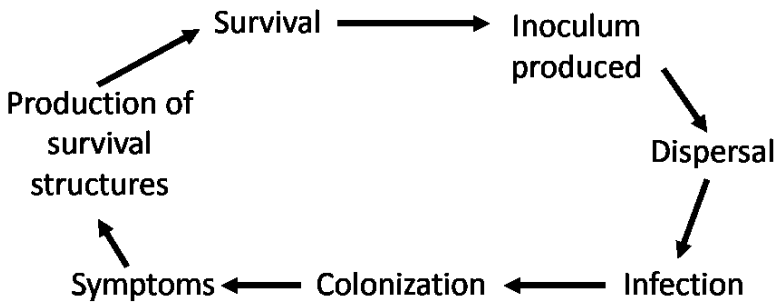


The Disease Triangle, shown in Figure 1.

To keep in mind, there are numerous variables that can affect the incidence and severity of disease in each of the three parts – host, pathogen, and environment. Variables such as genetic diversity, host plant biology and pathogen life cycles, and environmental conditions are all part of this equation.

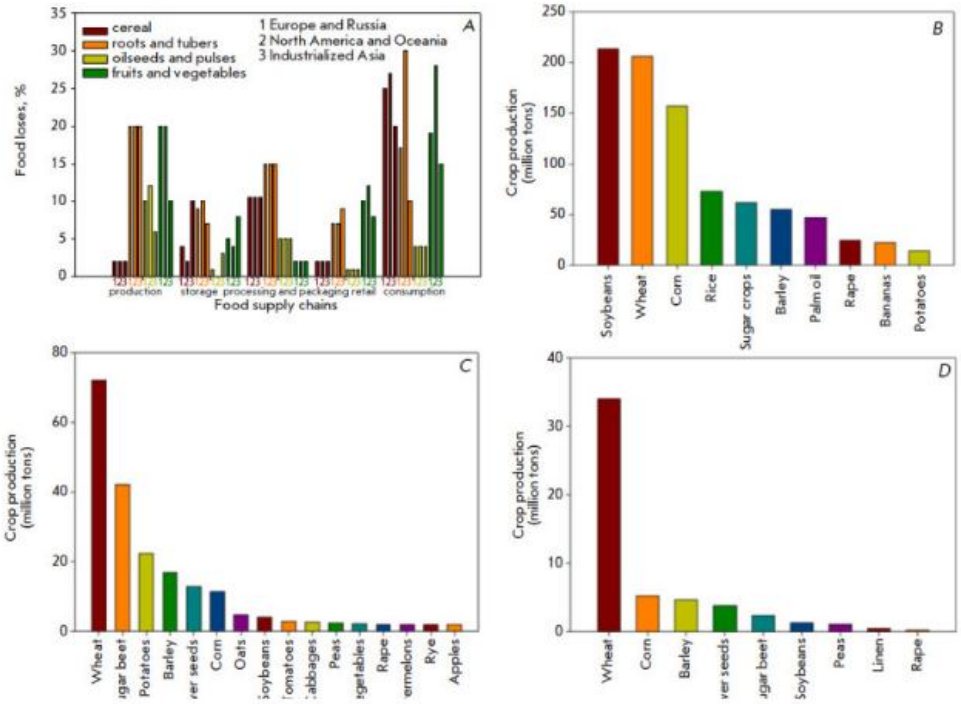
Pathogen Recurrence

A pathogen must invade plant tissues and cells in order for a disease to develop. Infection, penetration, infection, incubation, reproduction, and survival are all part of the process of disease development.



The Cycles of Illness in Fig 2.

Plant diseases caused by pathogens like fungi, bacteria, viruses, protozoa and parasitic plants are the most common. Crop yield and economic efficiency have been adversely affected by infectious plant diseases as agriculture has developed. Plants grown in monoculture have uniform conditions and requirements for planting, care, and harvesting in the field, resulting in higher yields and lower production costs than in polyculture. Over the past half-century, we have been able to reduce the amount of additional land required for food production by using newer technologies, such as monocultures. However, growing the same crop year after year in the same location depletes the soil, making it unfit for healthy plant growth. Monocultures' vulnerability to infectious diseases is also a major consideration. Even during the stages of storage, transportation, and distribution to the end user, losses can reach 30 % or more.



As depicted in Figure 3 In industrialised countries (those with a medium or high per capita income), crop losses occur throughout the production process from farming to consumer consumption. Three regions are represented in the results: North America and Oceania; 2; Europe; 3; Industrial Asia are the three regions that make up the world's industrialised regions (Japan, China, South Korea). Lost weight as a percentage of the total product mass is a way of calculating production losses. B - the world's top 10 most commonly grown crops (by import). In Russia, C crops are the most common type of plant. D - the primary Russian plant products exported

CONCLUSION

There can be no development of a plant disease without a host, pathogen, and the right conditions. Disease-causing pathogens in plants. Fungi, bacteria, viruses, and nematodes all play a role in plant growth. The pathogen-host interaction is described by the disease cycle. To better understand how phytopathogens affect plants, modern diagnostic approaches, genome editing and sequencing technologies, and microbiome and proteomic analysis methods have been developed.

REFERENCES

1. Al-Sadi AM. Variation in resistance to spot blotch and theaggressiveness of Bipolarissorokiniana on barley and wheatcultivars. J Plant Pathol 2016;98:97-103. doi: 10.4454/jpp.v98i1.0292.
2. Balique F, Lecoq H, Raoult D, Colson P. Can plant viruses cross thekingdom border and be pathogenic to humans? Viruses 2015;7:2074-98.doi: 10.3390/v7042074
3. Wagacha JM, Muthomi JW. Mycotoxin problem in Africa: Currentstatus, implications to food safety and health and possible managementstrategies. Int J Food Microbiol 2008;124:1-12. doi: 10.1016/j.ijfoodmicro.2008.01.0085.
4. Donald C, Porter I, 2009. Integrated control of clubroot. Journal of Plant Growth Regulation 28, 289–303.
5. Diederichsen E, Frauen M, Linders EGA, Hatakeyama K, Hirai M, 2009. Status and perspectives of clubroot resistance breeding in crucifer crops. Journal of Plant Growth Regulation 28, 265– 81.

6. Hwang SF, Ahmed HU, Zhou QX et al. , 2011. Influence of cultivar resistance and inoculum density on root hair infection of canola (Brassica napus) by Plasmodiophorabrassicae. Plant Pathology 60, 820– 9.
7. Haarmann T, Rolke Y, Giesbert S, Tudzynski P. Plant diseases thatchanged the world: Ergot: From witchcraft to biotechnology. Mol PlantPathol 2009;10:563-77. doi: 10.1111/j. 1364-3703. 2009.00548.x
8. Shkalikov V.A., Beloshapkina O.O., Bukreev D.D., Gorbachev I.V., Dzhalilov F.S.U., Korsak I.V., Minaev V. Yu., Stroykov Yu. M. Plant protection from disease. M.: Kolos, 2010. 404 p. 2010. [Google Scholar]
9. Cardinale B.J., Matulich K.L., Hooper D.U., Byrnes J.E., Duffy E., Gamfeldt L., Balvanera P., O'Connor M.I., Gonzalez A.. Am. J. Botany. 2011;98(3):572–592.
10. Maule A.J., Caranta C., Boulton M.I.. Mol. Plant Pathol. 2007;8(2):223–231. [PubMed] [Google Scholar]
11. van Loon L.C., Bakker P.A., Pieterse C.M.. Annu. Rev. Phytopathol. 1998;36:453–483.
12. Iftikhar Y., Jackson R., Neuman B.W., Pak. J. Agri. Sci. 2015;52(3):667–670. [Google Scholar]
13. Hull R. Plant Virology. Cambridge, MA: Acad. Press, 2014. 1118 p. 2014.