REVIEW OF RESEARCH
IMPACT FACTOR : 5.7631(UIF) UGC APPROVED JOURNAL NO. 48514 ISSN: 2249-894X
VOLUME - 8 | ISSUE - 4 | JANUARY - 2019

A STUDY ON PLANT AND PLANT PATHOGENS

Sushma Shama
Student in The Faculty of Science , Botany.
Biraul , Supaul Ramnagar, Supaul Darbhanga.

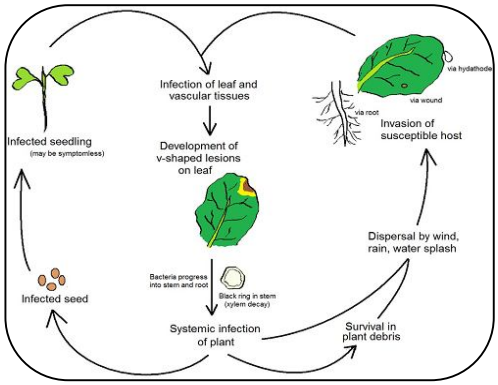
ABSTRACT

Plant pathology is a branch of horticulture that combines the study of plant diseases with the study of how to prevent and treat them. For the good of the crops, the plant pathology sciences are extremely important, as they are directly responsible for the major epidemics and major losses of crops. There is a first battleground between plants and pathogens in this extracellular space. In the early stages of infection, bacteria, fungi, and oomycetes encase the living plant tissues in this small area. As a result, the apoplastic region is thought to serve as the first point of contact between the host and the pathogen. Apoplastic interactions between host and pathogen are governed by the proteins and other metabolites secreted by both parties. As a result, research into protein secretion and apoplastic interaction could help scientists better understand the interactions between plants and microbes.

KEYWORDS: *Plant , Pathology , Pathogens Virus , Fungi.*

INTRODUCTION:

Pathogens that cause disease in plants include fungi, bacteria, protists, nematodes, and viruses, all of which fall under the umbrella term "plant pathogen." Concerns about vulnerable ecosystems and a desire to protect the food supply make plant pathogens of interest. Pathogens that cause disease in plants are harmful to growers and can affect any type of plant. Plant pathogens are a major source of concern for the health of crops and the wellbeing of people. Globally, the number of plant pathogens is on the rise. Anthracnose and parasitic plants are among the many pathogens that can infect plants. It is the pathogens of plants that cause disease in all the plant's organs, including the fruit. As a way of spreading disease and causing symptoms to appear, the pathogen attacks the plant in some other ways as well. There's a full infection caused by a successful interaction between plants and plant pathogens. Virulence mechanisms include: (1) phenotypic and genetic composition; (2) life history; (3) mode(s) of transmission; (4) environmental factors (Nishiguchi et al., 2008). When a plant pathogen attacks a plant and grows inside the plant without infecting it, this is known as the endophyte microbe system's incompatibility interaction behaviour. Plant pathogens of various genera infest the surface plant, but not all of these pathogens can cause disease in plants.



There are numerous uses for the plant's various parts including its leaves (which are used to make paper), its fruits (which are used to make wine), and its stem (which is used to make rope). Even the animals' food comes from animals that indirectly rely on plants for their diet and basic needs [3]. Plants are the only higher organisms in nature capable of converting light emery into chemical

energy and producing a variety of metabolites of different significances.

In order for a pathogen to flourish and persist, it only requires a host. Before exiting and infecting another host, the pathogen evades the host's immune system by taking advantage of the host's resources. A variety of ways can be used to spread pathogens. Contact with faeces, body fluids, airborne particles and skin to skin contact are all ways in which they can be spread. Another way is to touch something that has been touched by an infected person.

Plant diseases have been fought off for the past 100 years using chemical weapons like herbicides, fungicides, and heavy toxic chemicals. In order to completely eradicate the plant pathogens from the soil, it is necessary to control the pathogens not only from the surface, but also from the soil itself. In order to keep diseases under control without endangering crops, farmers must turn to less toxic and more environmentally friendly alternatives. The biological methods are extremely safe, and they eliminate pathogens by means of roots and in an environmentally friendly manner. Many new genetic engineering methods for disease control have been developed in recent years, but the main methods for disease control are still based on the use of antagonistic methods and plant breeding approaches.

PLANT PATHOGEN SYMPTOMS

Plants can be infected by a single pathogen or multiple pathogens, resulting in a more severe and complex disease. In most cases, the nature of the pathogen responsible for the disease can be determined by the external symptoms. Pathogens of plants can attack in a variety of ways. Colonization can occur in a variety of ways, including within the plant's tissue, on its surface, or in specific locations like the roots, stems, and leaves. Tissue death, browning, a decrease in fruit production, flower setting issues, and other issues are frequently caused by pathogens. They are capable of killing the host plant in severe cases.

The following are some typical signs and symptoms of plant diseases caused by fungi, bacteria, and viruses:

Fungal disease symptoms	Bacterial disease symptoms	Viral disease symptoms
	Leaf spot with yellow halo	Mosaic leafpattem
Birds•eye spot on berries (anthracnose)	Fruit spot	Crinkled leaves
Damping off of seedlings (phytophthora)	Canker	Yellowed leaves
Leaf spot (septoria brown spot)	Crown gall	Plant stunting
Chlorosis (yellowing of leaves)	Sheperd's crook stem ends on woody plants	

Diseases caused by fungal, bacteria, and viral organisms are depicted in Figure 1.

Bioassay is a useful method for detecting and identifying viruses, and uses indicator plants that show characteristic symptoms when infected. Laboratory-based virus test methods like ELISA and PCR, which were developed over the last few decades and are now routinely used in many labs, have been developed and are now being used. These procedures can be automated to increase sample throughput and deliver results more quickly.

Types Of Pathogens

A pathogen is a microorganism that causes disease in a living host. As they cause infections, pathogens are referred to as infectious agents. Pathogens, like all living organisms, place a high value on surviving and reproducing. Pathogens are protected by the human body's immune system. Some

pathogens are easily fought off by the body, but others can be deadly. Pathogens can be classified into five categories:

Viruses

Viral particles consist of genetic code such as DNA or RNA, which is encased in a protein shell. Your body is invaded by viruses once you become infected. The host cell's components are then used to aid in the replication of the virus. After the host cell has completed its replication cycle, new viruses are released. Infected cells are usually damaged or destroyed as a result of this.

Viruses can spread in a variety of ways, such as:

- through the airborne droplets of the lungs
- via direct contact with the infected person's blood
- by direct contact with the bodily fluids of a person who has the infection

Once dormant, some viruses reactivate and begin spreading. An individual appears to have recovered from a viral infection when this occurs, but then becomes ill again. Antibiotics are ineffective as a treatment for viral infections because they do not kill viruses. Depending on the virus, antiviral medications may be prescribed.

Bacteria

Bacteria are microscopic organisms that are composed of only a single cellular component. They come in a wide variety of shapes and sizes, and can survive in a wide range of environments, including inside and on top of human tissue. Bacteria that cause infections are rare. Pathogenic bacteria are those that can cause disease. There is a growing number of bacteria that have developed resistance to commonly prescribed antibiotics. There are a variety of shapes and sizes of single-celled, microscopic pathogens known as bacteria. Bacteria, which are typically larger than viruses, contain DNA in their nucleus. It is possible for them to thrive in any environment, and they reproduce quickly after entering the host body. Infection is caused by the release of toxins. However, not all bacteria are harmful. Many types of bacteria are found in the human body, and some of these may even be necessary for the body's basic functions.

Fungi

There are literally millions of fungal species on the planet. Sickness has been linked to as few as 300Trusted Source. Fungi can be found virtually anywhere, including on human skin and in the open air. When they get out of control, they can spread infection.

The nucleus and other internal organelles of fungi cells are shielded from damage by a cell wall and membrane. The way they're built could make them more difficult to kill. Memory is becoming more common among fungal pathogens, according to a study published in Trends in MicrobiologyTrusted Source. They are able to foresee dangers and prepare for them by relying on signals from their bodies.

Parasites

Tiny animals that live inside or on a host and feed off of the host are called parasites. Tropical and subtropical regions have a higher prevalence of parasitic infections, but they can occur anywhere.

Human disease can be brought on by any one of three types of parasites. These are some examples:

- single-celled organisms known as protozoa, which can live and reproduce in your body.
- the larger, multi-celled organisms known as worms, known as helminths, which can live inside or outside your body and are commonly known as worms
- Insects, such as ticks and mosquitos, are ectoparasites: multicellular organisms that live on or feed on your skin.

Helminths, or parasitic worms, can be seen with the naked eye and can live in any part of the human body.Worms such as:

- Tapeworms, for example, are flatworms that live in the gastrointestinal tract.
- This type of worm is found in the intestine and is known as a "thorny-head worm."
- These parasitic worms can live in the intestines as well as in the lymphatic system.

PROTISTS

These pathogenic single-celled organisms infect and debilitate their hosts. For the sake of their own survival and procreation, they infect other living things. Plants and food crops can be infected by phytopathogens. Dysentery, an infection of the intestines that results in diarrhoea, can be caused by eating foods that contain protists. It is possible for protist pathogens, such as mosquitoes, to be parasitic and live in other organisms. Malaria is spread by the bite of a mosquito carrying a protozoan parasite.

REVIEW OF LITERATURE

Crop disease is largely influenced by the weather. Climate change is causing new disease threats for farmers in many parts of the world, even though it is difficult to predict the long-term and local effects. Climate change is expected to lead to an increase in insect pest losses (Deutsch et al. 2018).

Temperatures in temperate regions, where crop production is currently the highest, are expected to be the most vulnerable to increased losses. Climate change's effect on crop disease is not yet known. As an example, it isn't clear if climate change will exacerbate disease challenges for potato late blight (Sparks et al. 2014). Pathosystems react differently to increases in CO2 and temperature, according to studies conducted under carefully controlled conditions (Gullino et al. 2018). There are numerous ways in which climate change affects viral diseases, including effects on plant growth and abundance, as well as the biology of vectors and viruses (Ryalls and Harrington 2017). Plant diseases are a significant cause of crop loss, accounting for 10% to 16% of total harvest losses each year (Oerke 2006; Strange and Scott 2005).

OBJECTIVES

1.to look into the causes of plant diseases, both natural and man-made,
2.to study pathogens' ability to cause disease,
3.in order to study the interactions between the plants and the pathogen
4. to devise strategies for combating disease and minimising the harm it causes.

RESULT AND DISCUSSION

To multiply, intracellular pathogens must enter the cells of the host, and this invasion must either be prevented or detected and eradicated as soon as it occurs. Viruses and bacteria (such as Chlamydia, Rickettsia, and Listeria species) and mycobacteria, which replicate in cellular vesicles, are examples of pathogens that replicate in the cell freely. Neutralizing antibodies whose production is dependent on TH2 cells.

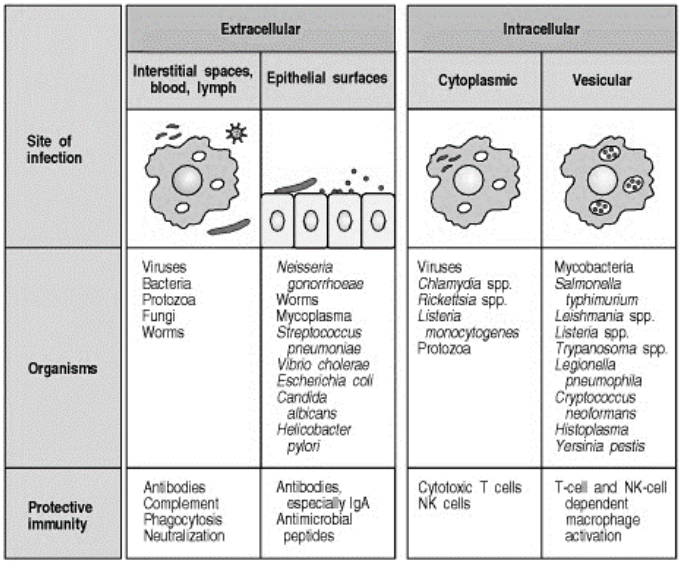


Fig. 1 is an illustration. There are a wide range of infectious agents that can cause a wide range of diseases, based on the different ways they damage tissues (Fig. 2). Pathogens that release specific toxins or proteins can induce the production of neutralising antibodies. Intracellular infectious agents frequently cause disease by damaging the cells they reside in. Cytotoxic T cells kill virus-infected cells specifically, which not only prevents the spread of the virus but also removes damaged cells from the body. One of the most common causes of disease is caused by a person's immune response to an infectious agent. Streptococcus pneumoniae in the lungs causes pneumonia while in the blood it causes a rapidly fatal systemic illness. The pathology caused by an infectious agent also depends on where it grows.

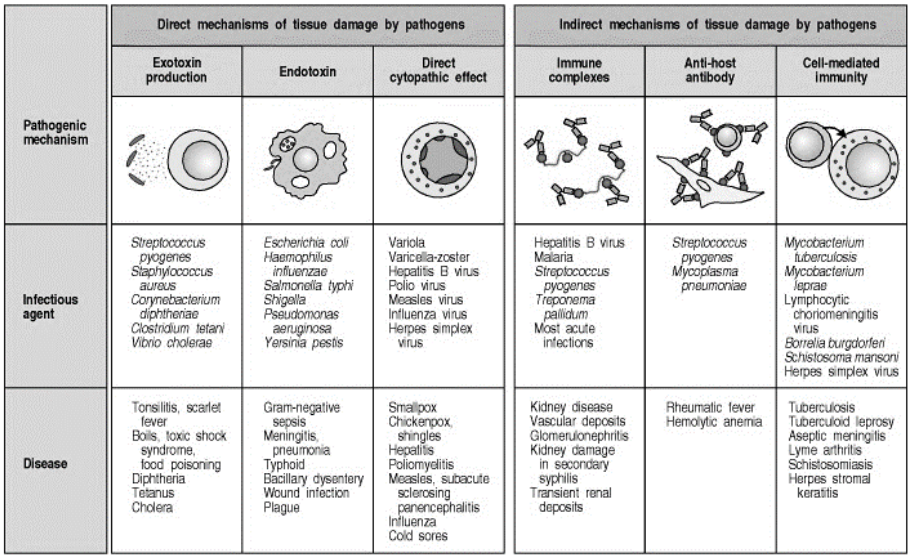


Fig. 2 Different infectious agents

CONCLUSION

Overall, these articles provide an overview of some of the most important aspects of plant pathology. As the era of plant pathology progresses and new horizons in the life sciences open, plant pathology is one of the most important subfields, largely responsible for the enormous growth of trees and the production of numerous commercially valuable crops.

REFERENCES

1. Plant Pathology. (3rd edn), Academic Press Netherlands, Europe.
2. Martinelli F, Scalenghe R, Davino S, Panno S, Scuderi, et al. (2014) Advanced methods of plant disease detection. A review. Agronomy for
3. Sustainable Development 35(1): 1-25.
4. Introduction to Mycology –1990 R. S. Mehrotra and K. R. Aneja, Wiley E. Ltd. New Delhi
5. 3. Plant Pathogens- The Fungi – 1982 R. S. Singh,Oxford and IBH Publishing Co., New Delhi.
6. 4. Introduction to Plant Viruses – 1987 C. L. Mandahar,Chand and Co., Pvt Ltd., New Delhi.
7. 5. Fungicides in Plant disease control – Nene Y L and Thapliyal P N 1993 Oxford & IBM Publishing Co.,New Delhi.
8. 4. Kamoun S, Furzer O, Jones JD, Judelson HS, Ali GS (2015) The Top 10 Oomycete pathogens in molecular plant pathology. Mol Plant Pathol
9. 16(4): 413-434.
10. Plant Pathology. Concepts and Laboratory Exercise.Trigiano, R.N., Windham, M.T. and Windham. A.S.(eds), 2004. CRC Press, New York.