

ASSIGNMENT ON BOTANY

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INTRODUCTION

Plant disease is an impairment of the normal state of a plant that interrupts or modifies its vital functions. All species of plants, wild and cultivated alike, are subject to disease. Although each species is susceptible to characteristic diseases, these are, in each case, relatively few in number. The occurrence and prevalence of plant diseases vary from season to season, depending on the presence of the pathogen, environmental conditions, and the crops and varieties grown. Some plant varieties are particularly subject to outbreaks of diseases while others are more resistant to them.

TRANSMISSION DISEASES

Pathogenesis and saprogenesis

Pathogenesis is the stage of disease in which the pathogen is in intimate association with living host tissue. Three fairly distinct stages are involved:

1. Inoculation: transfer of the pathogen to the infection court, or area in which invasion of the plant occurs (the infection court may be the unbroken plant surface, a variety of wounds, or natural openings—e.g., stomata [microscopic pores in leaf surfaces], hydathodes [stomata-like openings that secrete water], or lenticels [small openings in tree bark])
 2. Incubation: the period of time between the arrival of the pathogen in the infection court and the appearance of symptoms
 3. Infection: the appearance of disease symptoms accompanied by the establishment and spread of the pathogen.
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- Saprogenesis is the part of the pathogen's life cycle when it is not in vital association with living host tissue and either continues to grow in dead host tissue or becomes dormant.
 - During this stage, some fungi produce their sexual fruiting bodies; the apple scab (*Venturia inaequalis*), for example, produces perithecia, flask-shaped spore-producing structures, in fallen apple leaves. Other fungi produce compact resting bodies, such as the sclerotia formed by certain root- and stem-rotting fungi (*Rhizoctonia solani* and *Sclerotinia sclerotiorum*) or the ergot fungus (*Claviceps purpurea*).
 - These resting bodies, which are resistant to extremes in temperature and moisture, enable the pathogen to survive for months or years in soil and plant debris in the absence of a living host.

DISSEMINATION DISEASES

1. Dissemination by Seed
2. Dissemination with Manure
3. Dissemination with Soil
4. Dissemination by Field Operations and Implements
5. Dissemination by Insects
6. Dissemination by Animals Other Than Insects
7. Dissemination by Air Currents
8. Dissemination by Water

Dissemination by Seed:

Pathogens may be carried inside or outside the seeds or fruits functioning as seeds. The infective materials may be mycelium, spores or any other part of the pathogens.

One of the examples of externally seed-borne pathogen may be cited from *Tilletia caries* causes bunt of wheat; that of internally seed-borne is *Ustilago nuda* var. *tritici*, and of pathogen borne between the glumes and kernels in *Ustilago hordei* and *U. avenae* causing smuts of wheat, barley and oats respectively.

Dissemination with Manure:

Pathogens are disseminated when manures like, compost and cowdung are used particularly in seed bed soil contaminated with various pathogens. This is rather common with the damping-off of seedling disease.

Dissemination with Soil:

Transference of soil from one area to the other is a very common practice. When such soil is contaminated with pathogen knowingly or unknowingly contamination 'through soil is spread. Clubroot of crucifers is an example.

Dissemination by Field Operations and Implements:

Pathogens may be disseminated by field operations, such as, transplanting of seedling, watering, weeding, harvesting operations and through implements. Example may be cited from the dissemination of the tobacco mosaic virus disease.

Dissemination by Insects:

Insects play a very important role in the dissemination of plant diseases. The mechanism of dissemination, however, is extremely variable which depends on the nature of insects and the nature of inocula of the diseases. Again the insects may play direct or indirect role.

Dissemination by Animals Other Than Insects:

Nematodes, snails, birds, and wild and domestic animals often help dissemination of plant diseases. Yellow ear rot of wheat disease caused by *Corynebacterium tritici* is dispersed by nematode *Anguina tritici*, seeds of *Dendrophthae* sp. are disseminated by birds, and cattle feeding with contaminated fodder often pass out viable fungal propagules (conidia, and sclerotia) in their dung are disseminated at different places.

Dissemination by Air Currents:

The spores of many parasitic fungi are disseminated by air currents from diseased to disease-free host. This may be illustrated from the spread of Powdery mildew disease. Besides this, the air currents may indirectly help dissemination of plant diseases. For example, diseased plant parts may be caught up by air currents and brought to distant places to spread disease.

Dissemination by Water:

- (i) Flagellate spores of pathogenic fungi are entirely dependent on the supply of water for their dissemination, example, and Wart disease of potato;
- (ii) Pathogens like, bacteria are often disseminated by splashing of raindrops, as in case of Citrus canker disease
- (iii) Dissemination of conidia of red rot fungus (*Colletotrichum falcatum*) takes place through flowing irrigation water or rain water