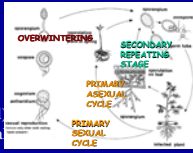


Review of Lecture 5:

- Disease cycle diagrams:**
 'conventions' of the diagrams were described
 a primary cycle(s) was defined (sexual or asexual)
 a secondary (repeating) cycle was defined (asexual)
- Diseases can be categorized into two types of cycles:**
 monocyclic - initiated by primary inoculum only
 polycyclic - additional infection cycle(s) initiated by secondary inoculum
- Terms to help understand the time required to turn a cycle:**
 incubation period - from infection to symptom expression
 latent period (generation time) - from infection to new infectious propagule
 quiescent infection - post-infection pathogen dormancy



Disease cycle follow-up

The Primary cycle is initiated by inoculum (pathogen propagules) that had its beginnings in another season (or place)

Monocyclic diseases have primary cycles only

More than one type of primary cycle is possible depending on how the pathogen gets through the off-season (usually winter):

- specialized survival structure
- inactive within a host (crop or weed)
- in vegetative form in old crop debris
- free-living in soil (rare)

Lecture 6: Life Strategies of Pathogens

microbial vs biotic plant
parasitism vs pathogens

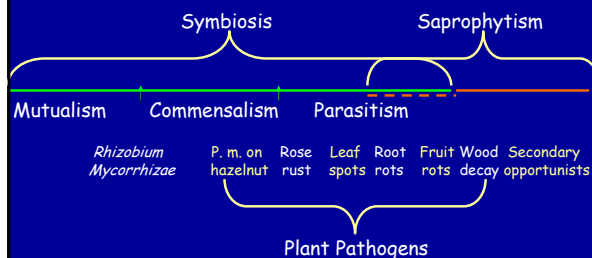
Are the concepts one in the same?

Parasitism:

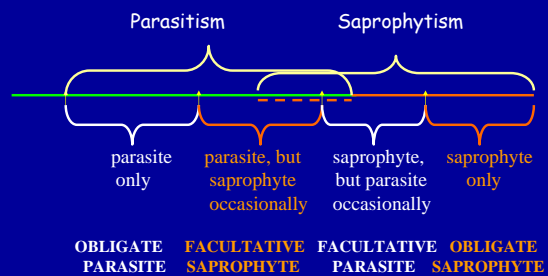
A type of symbiosis where a parasite is an organism living in or on another living organism, obtaining from it part or all of its organic nutriment, commonly exhibiting some degree of adaptive structural modification, and causing some degree of real damage to its host.

Webster's 3rd International

Microbial life strategies



Life strategies of plant pathogens



Defⁿ: obligate *adj.* - restricted to a particular style of life
 facultative *adj.* - optionally but not preferred

Parasites and mostly parasites

Obligate parasite – organisms that can grow only as a parasite in association with its host plant – generally, they cannot be grown in artificial culture media – rusts, powdery mildews, downy mildews, viruses, phytoplasmas

Facultative saprophyte - organisms that are normally parasitic but are capable of being saprophytic – typically, they can be grown and maintained in artificial culture media - smuts, leaf spotters, many root rotters, most bacterial pathogens

Saprophytes and mostly saprophytes

Facultative parasite - organisms that are normally saprophytic but are capable of being parasitic – they are easily grown and maintained in artificial culture media - crown gall bacterium, wood decay fungi, damping off fungi, fruit rotters, storage molds

Obligate saprophyte – only able to utilize nonliving organic matter – non-pathogens: wine and beer yeasts, bread and cheese molds, the creatures on the bottom shelf of your refrigerator

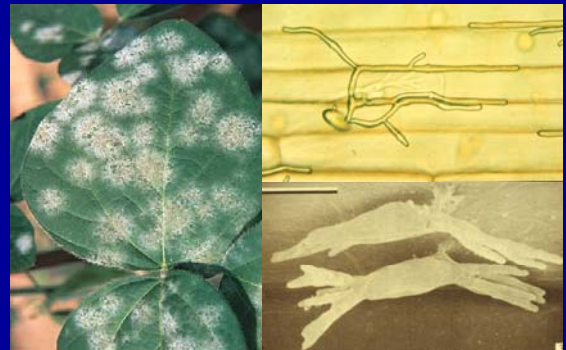
Styles of parasitism

Biotroph - an organism that obtains nutrients from living host cells only, and is able to reproduce only as long as its association with living cells is maintained

Generally, up to moderate disease, no death of host tissue is observed with biotrophic pathogens

All biotrophs are obligate pathogens (but the reverse idea can generate a mix of opinions)

Powdery mildew fungi are biotrophs



Necrotroph - a parasite that typically kills and obtains its energy from dead host cells.

In the classic 'necrotrophic interaction', toxins are secreted as the organism advances through host tissue (the pathogen produces its own herbicide)

The terms 'necrotroph' and 'biotroph' represent the opposing ends of a spectrum – there are pathogens in between that are difficult to classify as either

Necrotrophic leaf spot diseases

Tan spot of wheat



Early leaf spot of peanut



The 'classic' fungal necrotrophs commonly have asexual spores similar to these



Brown spot of rice



Next week: Ascomycetes

I & II

Lab manual pages: 35-50

For those reading the book, lectures have focused on topics described in Chapters 1 and 8, and we are working through Chapter 2 (fungi),

By the mid term, we also covered Chapter 9 sections A and B