

Plant Pathology 101

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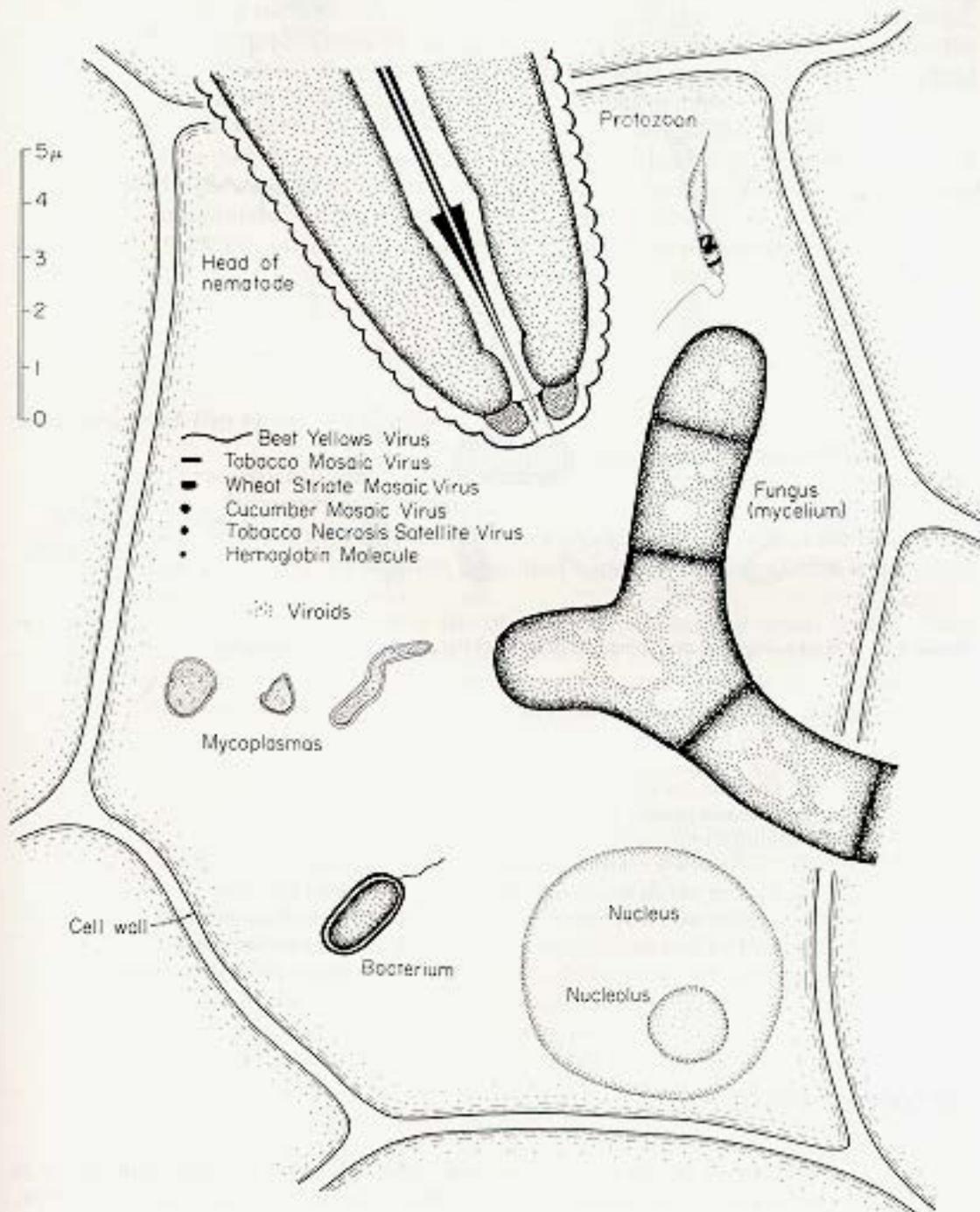
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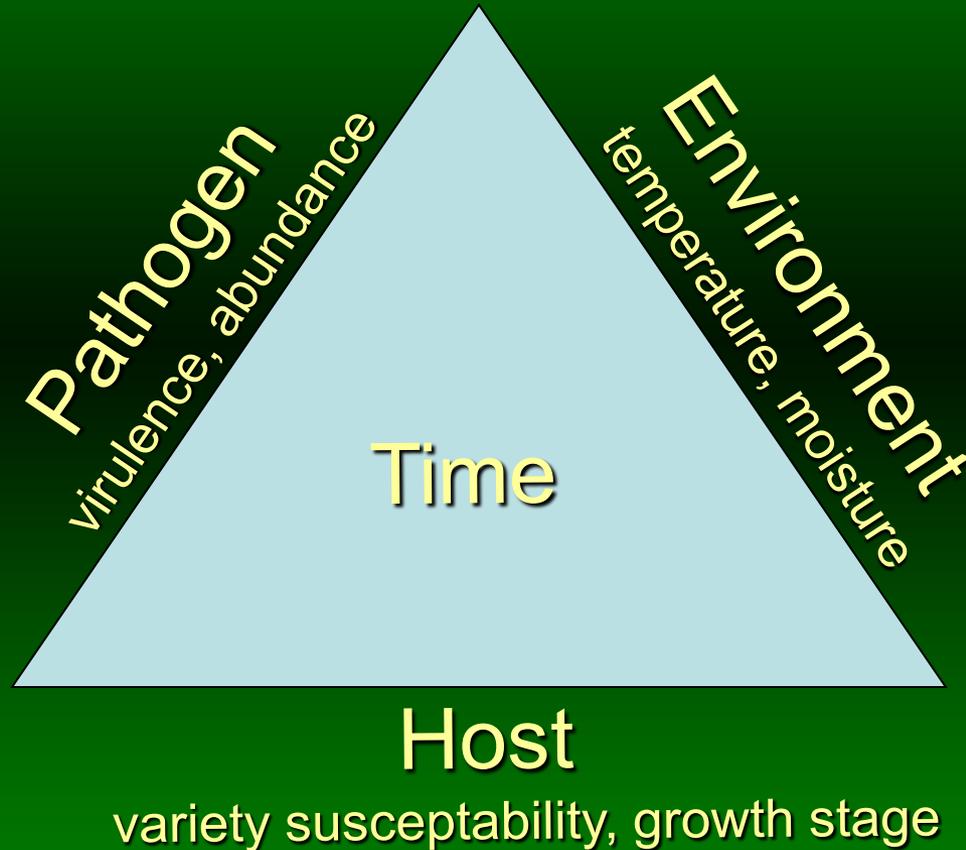
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Types of Pathogens (Know Your Enemy)

- Fungi
 - most diverse and most common (8,000)
- Bacteria
 - second to fungi in diversity and abundance (300)
- Viruses
 - depend on vectors to infect and spread (300)
- Nematodes
 - microscopic roundworms (2,500)
 - most are non-parasitic



Disease Triangle



Know Your Enemy

- Know what types of diseases affect the crops you want to grow.
- Be able to identify the diseases that may affect your crop. eg. symptoms and signs.
- Understand the ecology of the diseases you deal with. eg. life cycle, favorable environment.
- Try to find weak links or vulnerable areas in the pathogen life cycle to manipulate.

Know Your Host

- Know how a healthy plant looks and performs
- Know optimal water & nutritional requirements
- Know optimal plant spacing vs growth habit
- Know how fast it should grow, reach maturity
- Know periods when host is susceptible

Know Your Environment

- Know climatic factors essential for plant growth
- Know factors that favor disease outbreaks
- Pay attention to weather patterns

What About Time?

- Long-season crops are more “at risk”
- Short-season crops may “escape”
- Duration of weather patterns important
- Time of infection is important

Pathogens and Parasitism

- Parasitism – This is when one organism obtains nutrients from another where the parasite gains and the host does not. Not all parasites are pathogens.
- Pathogen – This is a disease causing agent. The pathogen parasite actually is detrimental to the host as in the disease definition.

Symptoms and Signs

- Symptom – This is the reaction of the plant to the pathogen or causal agent.
 - wilting, stunting, chlorosis, necrosis, lesion, canker, galling, etc...
- Sign – A sign of a disease is the observance of the actual organism causing the disease.
 - hyphae, fruiting structures, bacterial ooze, bacterial streaming, sporulation, cyst, etc....

SYMPTOM



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SYMPTOM



SIGN



SIGN



SIGN



SIGN



Identification

- Signs are best ID for fungus
 - can see hyphae and/or other structures
- Signs and symptoms okay for initial bacterial disease ID but followup must take place.
 - selective media
 - fluorescence
 - pathogenicity
 - ELISA
 - molecular tools
- Viruses require molecular or serological (ELISA)
ELISA=enzyme linked immunosorbant assay
- Nematodes require microscopic ID

After ID, Then Control?

- Once a disease is established, remedial control measures are not as effective as preventive.
- There is very little control, mainly suppression.
- Plant disease diagnostics is mostly forensic.
- Recommendations are made for upcoming crops.
- Plant disease management systems are best.