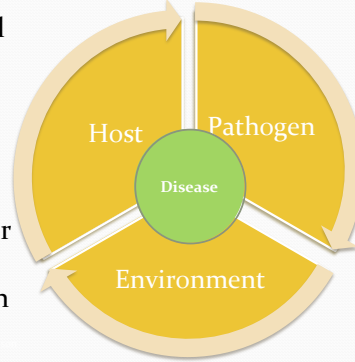


Integrated Pest Management

Pest Identification: Common Diseases

Plant diseases are the result of a physiological or morphological change in a plant that results in abnormal growth, appearance or development due to a pathogen. Pathogens are parasitic organisms that cause a disease. Pathogens include: fungi, bacteria, viruses, nematodes, phytoplasma.

The diagram to the right illustrates the three factors required for disease development: a host plant, casual pathogen and a favorable environmental conditions. Managing these factors can also help prevent and suppress disease populations.



Fungal Pathogens

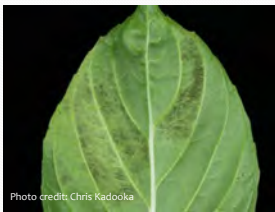


Photo credit: Chris Kadooka

Common plant disease composed of threadlike structures called hyphae. Reproduce and disperse by spores. Common fungal pathogen include: powdery mildew, downy mildew, *Alternaria*, *Cercospora*, *Phytophthora*, etc.

Nematode Pathogens



Photo credit: Dr. Scot Nelson

Roundworms that attack the root system of plants and impair water and nutrient uptake. Symptoms: stunting, poor plant growth, narrow and weak stems, foliar chlorosis, root rotting and galling, plant toppling and poor root development.

Viral Pathogens



Photo credit: R. Shimabuku

Viruses have a nucleic acid surround by a protein coat. They can only survive on living plant tissue. Once infected there is no cure. They are mainly transmitted by insect vectors. Common plant viruses include: Banana Bunch Top Virus, Tomato Spotted Wilt Virus, etc.

Bacterial Pathogens

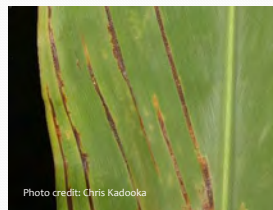


Photo credit: Chris Kadooka

Bacterial pathogens reproduce quickly and form masses called colonies. They are spread primarily via rain, or splashing water. They often enter plant tissue through natural openings or injury sites. Examples include: *Xanthomonas*, *Pseudomonas*, *Erwinia*, etc.

Phytoplasma



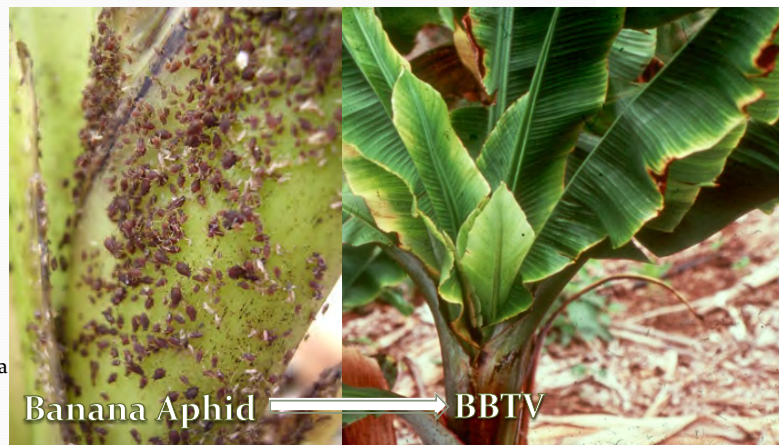
Phytoplasma is a bacteria which parasitizes on the phloem of plant tissue via an insect vector. Symptoms range from yellowing of plant tissue, cupping of leaves and even death of infected plants. Leafhoppers are often associated with vectoring of phytoplasmas like the Watercress Aster Yellow (WAY)

Example of a Plant Vector

Plant vectors are organisms that can transmit a pathogen such as a bacterium, virus, or phytoplasma into a plant.

EXAMPLES:

- Banana aphid → Banana Bunchy Top Virus (BBTV)
- Western flower thrips → Tomato Spotted Wilt Virus (TSWV)
- Aster Yellow Leaf Hopper → Watercress Aster Yellow Phytoplasma
- Onion thrips → Iris Yellow Spot Virus (IYSV)



Banana Aphid ↔ BBTV