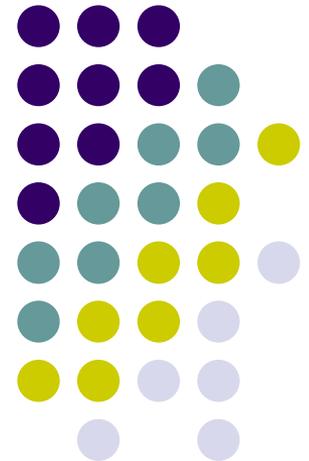


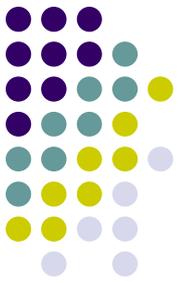
Detection vs. diagnosis – definition and differences



Healthy plants to feed the world



- Healthy crops are essential for safe, healthy, and sustainable farming. They contribute to the quality of food and life
- Reliable diagnostics for the timely detection of plant pests and diseases provide the basis for healthy crop production
- This is how diagnostics helps controlling risks and provides security during crop production



What is a plant disease?

- Any disturbance of a plant that interferes with its normal growth and development
- Plant diseases are caused by
 - Biotic causes
 - Abiotic causes

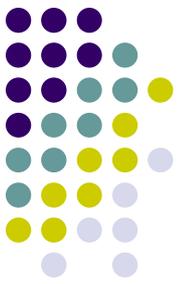


- Plant diseases cause
 - major production and
 - economic losses in agricultural industries worldwide
- Early information on crop health and disease detection can
 - facilitate the control of diseases
 - minimize economic losses

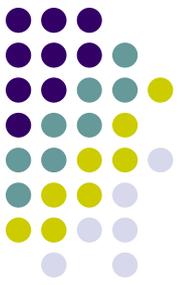


Detection vs. Diagnosis

- In practice, to "**detect**" a problem is to objectively observe symptoms caused by the problem whereas to "**diagnose**" a problem is to ascertain the specific pathological condition that is causing the problem.



- Identification of the disease-causing agent may take a week or more. The following aspects are important:
 - Use the powers of observation
 - Ask questions related to the disease in order to eliminate or identify possible causes of the problem
 - Consider various environmental and cultural factors.
- As a result of his/her questions and observations the diagnostician may:
 - Be able to identify a disease and disease-causing agent
 - Be able to narrow the problem down to several possibilities which will require further study in the laboratory or
 - Be completely baffled by the problem

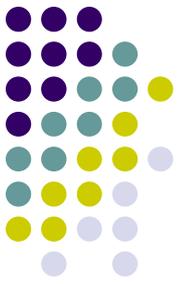


Know what is normal

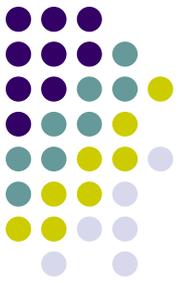
- Proper plant identification
- Recognize healthy plant appearance



Identification of characteristic symptoms

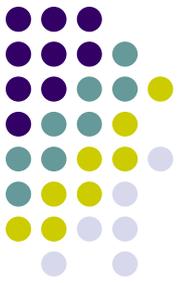


- Underdevelopment of tissues or organs
- Overdevelopment of tissues or organs
- Necrosis or death of plant parts
- Alteration of normal appearance



Sign vs. Symptom

- Disease **symptoms** are changes in a plant's appearance in response to a pathogen that deviates from its normal appearance
 - Fungal fruiting bodies such as powdery mildew on leaf is the parasitic fungal disease organism itself.
- Disease **signs** are structures of the plant pathogen visible on the infected plant
 - Common bacterial blight symptoms include brown, necrotic lesions surrounded by a bright yellow halo at the leaf margin or interior of the leaf on bean plants



- **Fungal disease signs:**

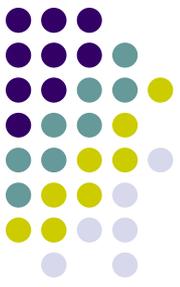
- Leaf rust (common leaf rust in corn)
- Stem rust (wheat stem rust)
- Sclerotinia (white mold)
- Powdery mildew



- **Fungal disease symptoms:**

- Birds-eye spot on berries (anthracnose)
- Wilting of plants (Fusarium)
- Leaf spot (septoria brown spot)
- Chlorosis (yellowing of leaves)





- Bacterial disease signs (difficult to observe, but can include):

- Bacterial ooze
- Water-soaked lesions
- Bacterial streaming from cut stem



- Bacterial disease symptoms:

- Leaf spot with yellow halo
- Fruit spot
- Canker
- Crown gall
- Sheperd's crook stem ends on woody plants





- Viral disease signs:
 - None – the viruses themselves can't be seen
- Viral disease symptoms:
 - Mosaic leaf pattern
 - Crinkled leaves
 - Yellowed leaves
 - Plant stunting





Identify symptom variability



- Peach seedlings infected with various viruses alone or in combination. Peach seedlings infected with both *Prune dwarf virus* and *Prunus necrotic ringspot virus* (seedling on left), infected with *Prune dwarf virus* (seedling in middle) and infected with *Prunus necrotic ringspot virus* (seedling on right)