

PLP 3002

Vascular wilt diseases

Featured pathogens

- *Fusarium oxysporum*
- *Verticillium*
- *Erwinia tracheiphila* (cucumber wilt)
- *Pseudomonas solanacearum* (Southern wilt)
- *Ophiostoma ulmi* (Dutch elm disease)
- *Cryphonectria parasitica* (chestnut blight)

Overview of vascular wilts

- **Symptoms**
 - Sudden wilt & death of plants
 - Premature yellowing of lower leaves
 - Vascular discoloration (for fungal wilts)
 - Viscous ooze in vascular system (for bacterial wilts)

Overview of the vascular wilts

- **Common denominators**
 - **Most cause sudden wilt by plugging the xylem**
 - **Most are soil-borne**
 - **Some need vectors (Dutch elm, cucumber wilt)**
 - **Most have restricted host ranges**

Fusarium oxysporum

- **Similar to Verticillium**
- **Trinomials**
 - **F. oxysporum f. sp. lycopersici (tomatoes)**
 - **F. oxysporum f. sp. cubense (banana)**
 - **Others infect coca, cannabis**
- **Subspecies have races**

Fusarium oxysporum (Deuteromycete)

- **Macroconidia**
- **Microconidia**
 - **Chlamydospores**
 - **Teleomorphs are Ascomycota**

Vascular wilts caused by bacteria

- **Erwinia tracheiphila (cucumber wilt)**
 - Very narrow host range (certain cucurbits)
 - Transmitted by flea beetles (disease forecasting)

Vascular wilts caused by bacteria

- **Pseudomonas solanacearum (Southern bacterial wilt)**
 - Some races infect solanaceous plants, others bananas (moko)
 - Mostly tropical, subtropical disease
 - Survives in plant debris, tubers, wild hosts

Dutch elm disease/chestnut blight scenarios

- **Ophiostoma ulmi (Ascomycota)**
 - Perithecia
 - Conidia
- **Cyrrhonertria parasitica**
 - Perithecia
 - Conidia

- Both introduced in USA
- Both exterminated respective native hosts
- Dutch elm disease true vascular wilt
- Chestnut blight a canker disease
- Quarantine for Dutch elm disease failed because the entire life cycle not understood (Fungus survives beneath bark)

Mechanism of attack (Dutch elm)

- Fungus mostly a saprophyte
 - Colonizes bark beetle galleries
 - Bark beetles emerge, feed on spring xylem

- Lesser European elm bark beetle efficient vector (Native American elm bark beetle inefficient vector because it feeds too early in the season)

Control of vascular wilts

- **Tomato, banana fusarium wilt (resistant varieties)**

Control of vascular wilts

- **Cucumber wilt**
 - Disease forecasting (spray for beetles when winters are mild)
- **Southern bacterial wilt**
 - Use clean tools
 - Crop rotation
 - Fallow
 - Use clean planting stock

Control of vascular wilts

- **Dutch elm disease**
 - Destroy infected trees
 - Remove bark from dead trees
 - Genetic resistance (Oriental elms)
