Lect. 7

Ascochyta Leaf and Pod Spot & Ascochyta Seedborne.
Ascochyta pisi

Shoot infection | Seedling infection | Pod infection | Peas discolored

Ascochyta Blight in Peas

Two species of the Ascochyta fungus can cause this disease:

- *Ascochyta pisi*
- *Ascochyta pinodella*, also known as *Mycosphaerella pinodella*

Ascochyta leaf spot (*A. pisi*) stem lesion

Symptoms:

- Symptoms include lesions on all plant parts, seedling blight and foot rot.
- Lesions start as small dark flecks on the lower parts of the plant and enlarge under humid conditions, alternating rings of gray and brown.
- These lesions may reveal small dark fruiting bodies.
- Infection may also be present in the form of foot rot, a blackening of the stem and upper root where the seed is attached.
- Infected seed can be shriveled.

Infection:

- Infection originates from diseased seed or from spores growing on debris in the soil near pea plants.
- Pod infection of 10% to 15% will likely produce seed that is 5% to 10% infected

Environmental condition:

- Lesions expand rapidly under humid, warm conditions (15° C to 25° C).
- Fruiting bodies are produced in the lesions after about 13 days.

Spread:

This pathogen spreads in two basic ways:

It spreads short distances by water splash, and by planting equipment,

and long distances by infected transplants and seeds.

Yield loss:

Average yield loss in an infected pea crop is about 10% but can be as high as 50% when conditions favour the disease.

Test for Ascochyta in Peas:

200 seeds are surface sterilized to remove contaminants on the seed coat then placed on culture agar and incubated for 7 days.

Colonies of these fungi are recognizable by the type and color of the mycelium and the spore-bearing structures produced.
This test takes one week to complete.

Control:

- Many pea cultivars are resistant to A. pisi.
- Crop rotation of 3 - 4 years.
- Foliar fungicide treatments.
- Disease- free seeds.

Fusarium Wilt (*Fusarium oxysporum f.sp. pisi*)

Fusarium oxysporum is the most widely dispersed of the *Fusarium* species and is found worldwide.

Symptoms:

Fusarium oxysporum generally produces symptoms such as wilting, chlorosis, necrosis, premature leaf drop, browning of the vascular system, stunting, and damping-off.

- The lower leaves of the affected plant turn yellow and there is a stunting or dwarfing of the plant.
- The affected stem, just below the soil line, turns reddish to dark brown.
- The internal woody stem tissue might also turn a brick red.

Fusarium wilt in a pea field

Yellow, red, orange or rustic discoloration of the vascular tissue in pea

Survival:

F. oxysporum is a common soil saprophyte that infects a wide host range of plant species around the world.
It has the ability to survive in most soil debris as a mycelium and spores

The pathogen is very long lived in the soil (chlamydospores) and can increase in a field each time you replant the susceptible crop.

Environment:

- Development of the disease is favored by high temperatures and warm moist soils.
- The optimum temperature for growth on artificial media is between 25-30°C, and the optimum soil temperature for root infection is 30°C or above.
- However, infection through the seed can occur at temperatures as low as 14°C.

Losses:

This pea disease occurs in many races and has the potential to be the most destructive disease.
Fusarium wilt and root rot diseases are a major cause of loss in pea productivity.
In some cases, this pathogen has caused partial to complete loss of pea crop and is capable of causing such damage to other crops as well.

Management

- Can live in the soil for long periods of time, so rotational cropping is not a useful control method.
- Removing infected plant tissue to prevent overwintering of the disease
- Resistance varieties.
- Seed treatments.
- Applying fungicides

White mold (*Sclerotinia sclerotiorum*)

Host Crops

Peas, broad beans, green beans, dry beans, runner beans.

White stem rot appears

Sclerotia inside pea pod

Symptoms:

- Individual plants or small groups may be infected in discrete areas over the field.
- Infected stems become covered with white mycelium and the stems may collapse in a watery soft rot
- The stems are often bleached as they desiccate and the upper plant parts wilt and die.
- Infected stems and pods may also contain black, elongated resting bodies (sclerotia), which may develop on or within the diseased tissue

Stem rot (*Sclerotinia sclerotiorum*) on peas.

Pod rotting

Economic Importance:

- Infection by *S. sclerotiorum* is common in some areas, particularly where the previous cropping contained other host crops.
- *S. sclerotiorum* has a very wide host range, which includes vegetables, potatoes, linseed, oilseed rape, sunflowers, and soya beans.
- Sclerotia can contaminate the harvested crop of both beans and peas, where they are difficult to remove in the processing factory.

Survival:

- Sclerotia can remain in the soil for several years.
- The sclerotia produce small cup-shaped apothecia, which release spores into the air.
- Spores may adhere to stems where they have been damaged or they may colonize flower before invading the stem tissue.

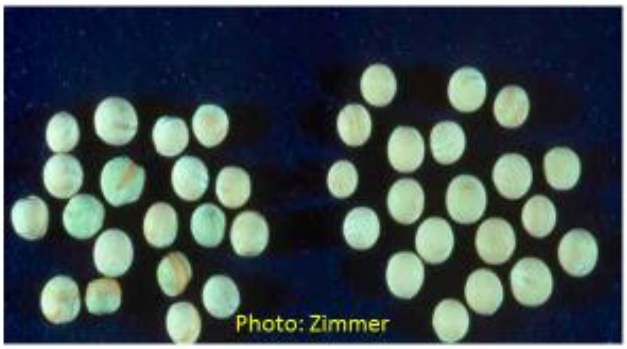
Environmental conditions:

Infection is favoured by wet and warm conditions, and by densely planted crops.

Management strategy

- Do not grow peas after crops susceptible to sclerotinia such as canola and beans.
- Follow a 3 - 4 year rotation
- and grow leafless types.
- Where the disease is expected, a preventative fungicides should be applied during flowering.

Pea Seedborne Mosaic Virus



Symptomless pea virus infection

Virus infected and virus-free seed

Occurrence:

- Important virus disease, found to be common in pea germplasm collections in many countries.

Symptoms:

- Stunting and downward leaf curling on pea seedlings.
- Vein clearing and mosaic may present.
- Pods are often very short and contain few, if any, peas.
- Seed coats of infected seeds show a necrotic line pattern.

Control:

- Use pea seed lots free of the virus.
- Control aphids.
- Use resistant pea cultivars.

T.A.