



# **DISEASES OF MUSTARD CROP**

Session-4  
M.S.Swaminathan School of Agriculture,CUTM



# Alternaria blight of mustard

This is a fungal disease

CENTRAL BOARD OF SECONDARY EDUCATION  
UNIVERSITY

Shaping the Future  
Empowering Communities...

Alternaria blight causes 32-57 % of average yield loss

## Symptoms

- The fungus attacks the lower leaves as small circular brown necrotic spots and slowly increase in size.
- In severe cases many concentric spots coalesce to cover large patches showing blighting and defoliation.
- Circular to linear dark brown spots also develop on stems and pods which becomes elongated at later stage.
- Infected pods produce small discolored and shriveled seeds.



# Alternaria blight of mustard

Centurion

U  
S  
E



# Causal organism

*Alternaria brassicae* (fungus)

Sub-division-Deuteromycotina

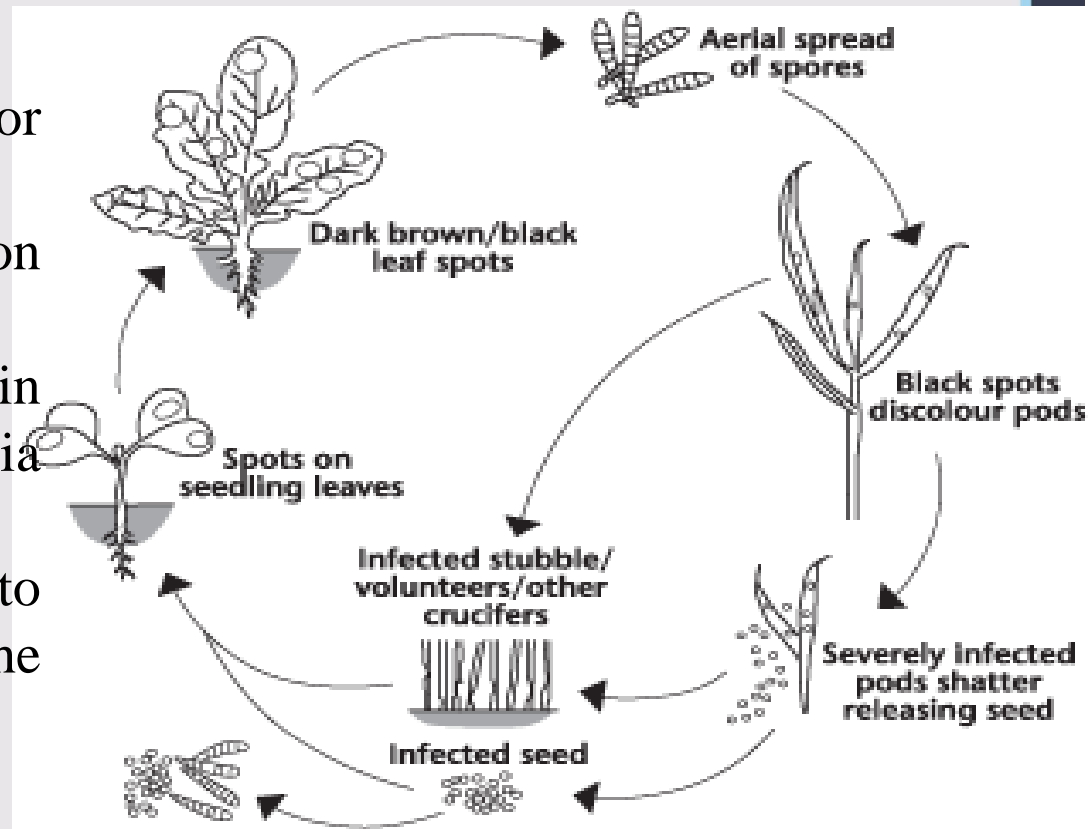
Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities...

Conidia are the asexual spores formed. They are formed in chains or solitary, typically ovoid to obclavate, often beaked, pale brown to brown, multi-celled and muriform.

## Disease cycle

- Conidia are spread by wind or rain.
- They fall on leaves and also on pods.
- The infected pods contain infected seeds and conidia remains in stubbles.
- Infected seeds give rise to seedlings which contains the pathogen.





Centurion  
UNIVERSITY

*Shaping Lives...  
Empowering Communities*

# SURVIVAL AND SPREAD

• Disease is externally and internally seed borne

- Pathogen survives through conidia or mycelium in diseased plant debris or weed
- Relative humidity more than 70% coupled with warm weather (12-25 °C) and intermittent rains favor disease development



Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities...

# DISEASE MANAGEMENT

- Healthy seeds to be used for sowing.
- Affected plant portions should be collected and burnt.
- Deep ploughing, timely weeding and maintenance of optimum plant population.
- Spraying soil isolates of *Trichoderma viride* at 45 and 75 days after sowing.
- Spraying Mancozeb @ 0.2 Kg in 100 l of water per hectare as soon symptoms appears.



# WHITE RUST OF MUSTARD

## Symptoms

Shaping Lives...  
Empowering Communities...

- All aerials parts of the plant are attacked.
- White or creamy yellow pustules of various shape and size appears on the surface of the leaves, mainly on the lower surface.
- In severe infection the leaves become thick, fleshy, inrolled and their size becomes reduced.
- If young stems and inflorescence are infected the fungus becomes systemic inside tissues and produces deformities like swelling and distortion of the floral parts mainly due to hypertrophy and hyperplasia forming a staghead structure.



# SYMPTOM ON FLORAL PART

Centurion  
UNIV  
Shaping Life  
Empowering







**Centurion**  
**UNIVERSITY**

*Shaping Lives...  
Empowering Communities...*

# SYMPTOM ON LEAF





# CAUSAL ORGANISM

## *Albugo candida*

Centurion

UNIVERSITY

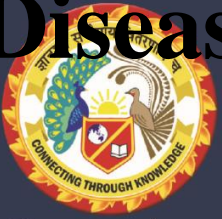
Shaping Lives...

Empowering Communities...

## Class- Oomycetes

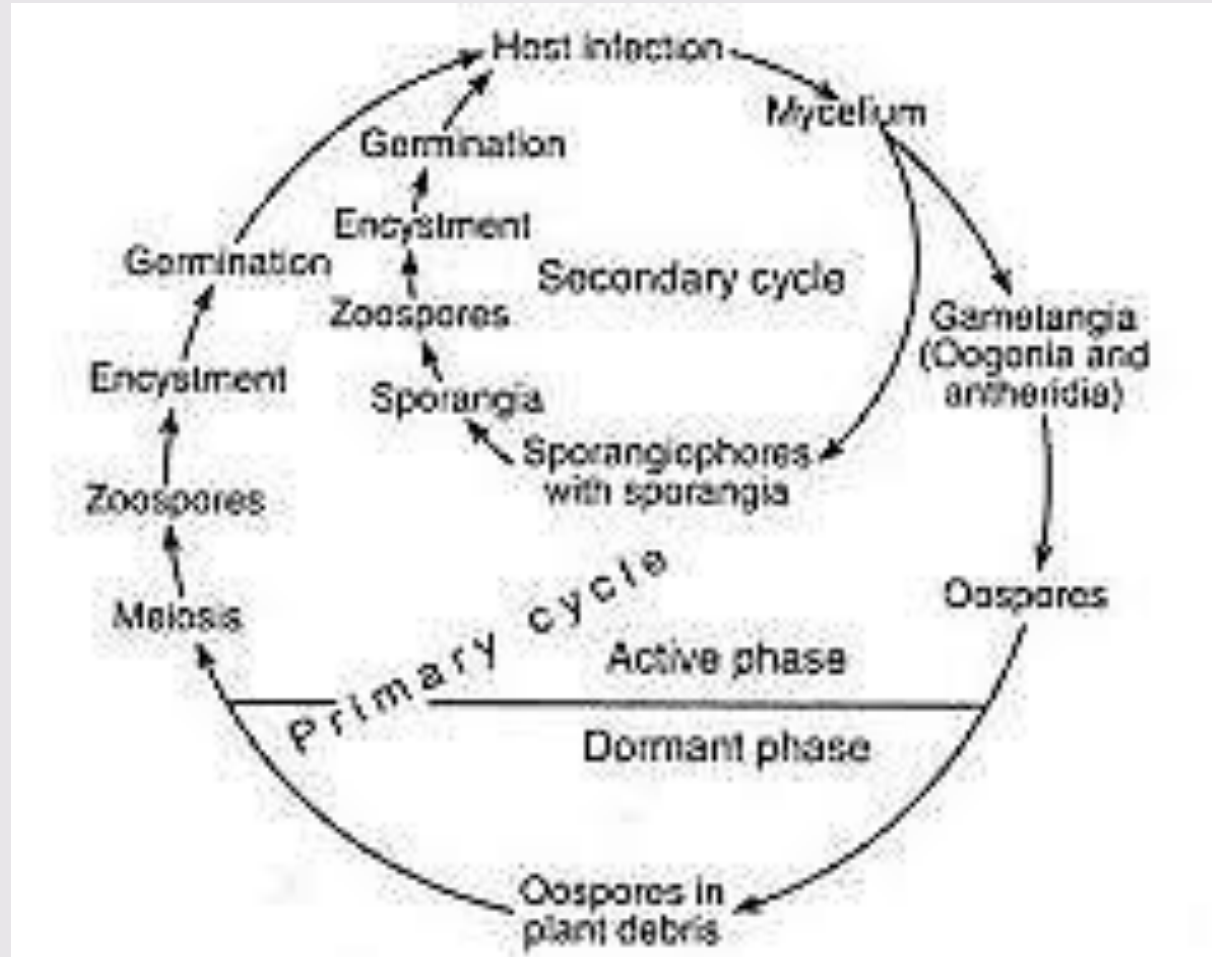
- Mycelium of fungus is intercellular forming knob like haustoria in the host cells
- Hyphae forms beneath the epidermis and it gives rise to the sporangial beds or sori
- Sporangioophores arise from the sori are free from each other laterally and are very thick towards the base
- Sporangia are formed in basipetal succession in chains are hyaline, and spherical and produces zoospores
- Oogonia and anthredia are formed from intercellular mycelium in intercellular spaces
- Oospores are formed from their fertilization in hosts and their germination takes place by formation of zoospores

# Disease cycle



Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities...



- Pathogen perpetuates through the oospores lying in soil or diseased debris.
- Weed hosts serve as primary source of inoculum.
- Secondary spread of pathogen is by sporangia and zoospores.



Centurion  
UNIVERSITY

*Shaping Lives,  
Empowering Communities.*

# EPIDEMIOLOGY

- The sporangia germinates at an optimum temperature of  $10^{\circ}\text{C}$  .
- RH should be more than 65% with less temperature of  $15^{\circ}\text{C}$ .
- Crops sown late are more disease prone.



Centurion  
UNIVERSITY

*Shaping Lives  
Empowering Communities*

# MANAGEMENT

- Destruction of weeds in and around the fields should be done.
- Crop rotation.
- Rotation with non-cruciferous crops.
- Seed dressing with Metalaxyl @6g/kg seed followed by a single spray with Metalaxyl + Mancozeb (Ridomil gold)@0.2%.



# DOWNNEY MILDEW OF MUSTARD

Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities...

## Symptoms

- Grayish white irregular necrotic patches develop on the lower surface of the leaves.
- The upper surface of the leaves yellow spot is there corresponding to necrotic spot on lower surface.
- Later under favourable conditions brownish white fungal may also be seen on the spots.
- The most pronounced symptom is the infection of inflorescence causing hypertrophy of peduncle. (**Stag head**)
- The affected inflorescence does not produce any siliqua or seed.



# DOWNNEY MILDEW OF MUSTARD

Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Com





# CAUSAL ORGANISM

Centurion  
UNIVERSITY

*Sapientia Vivit*  
Empowering Communities...

## *Peronospora parasitica*

### Class- Oomycetes

- *Peronospora* is an obligate parasite , mycelium is intercellular with large finger shaped haustoria.
- Numerous branched sporangiophores emerge through the stomata on undersurface of leaves.
- Sporangiophores are 6-8 times dichotomously branched at the tip, each tip producing one sporangium .
- Spherical, hyaline oogonium is fertilized by single anthredium and produces pale yellow coloured globose oospores.





Centurion  
UNIVERSITY  
Shaping the Future...  
Empowering Communities...

# DISEASE CYCLE

- Sporangia lands on suitable host germinates, produces appressoria and enters into the host epidermis.
- The hyphae grows intercellularly forming haustoria.
- They produce sporangiophore bearing sporangia (asexual cycle) and also anthredium and oogonium which fertilizes to give the oospores (sexual cycle) .
- Pathogen survives in the form of oospores. They occur on the surface and in the hypodermis of seed coat and these infected seeds produce seedlings with downey mildew symptoms.
- Wild hosts also serve as a source of primary inoculum.
- Secondary spread caused by sporangia.



Centurion  
UNIVERSITY  
Shaping Lives...  
Empowering Communities

# EPIDEMIOLOGY

Temperature in the range of 10-20°C and relative humidity more than 90% favours disease development.

## Disease management

- Collect and destroy infected plant debris.
- Rotation with non-cruciferous crops.
- Seed dressing with Metalaxyl (Apron 35SD)@6g/kg seed .
- Single spray with Metalaxyl + Mancozeb (Ridomil gold)@0.2%.



Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities

# SCLEROTINIA STEM ROT

## SYMPTOMS

- Stems develop water soaked spots near to crown region which later may be covered with cottony white mycelium.
- As disease progresses the affected portions of stem develops a bleached appearance at the internodes and eventually the tissues shreds.
- Premature ripening and shredding of stem , wilting, and drying
- In later stage black sclerotial bodies are also seen on infected plants.



**Centurion**  
**UNIVERSITY**

*Shaping Lives...  
Empowering Communities...*

# SCLEROTINIA STEM ROT





Centurion  
UNIVERSITY

*Shaping Lives...  
Empowering Communities*

# CAUSAL ORGANISM

## *Sclerotinia sclerotiorum*

Asexual spores (conidia) are not formed

Sclerotia is the survival structure.

### Disease cycle

- **Primary infection:** sclerotia survive in soil.
- **Secondary infection:** By irrigation water.

### Favourable conditions

- High humidity (90-95%) and average temperature (18-25 °C) along with wind current favours the disease development.



Centurion  
UNIVERSITY

Shaping Lives...  
Empowering Communities.

# MANAGEMENT

- Use crop rotation; do not plant highly susceptible crops more than once in four years, including dry edible beans, sunflowers, mustard and canola. Use at least a five year rotation for severely infested fields.
- Avoid planting next to a field that had severe *Sclerotinia* in the past four or five years. Control broad-leaved weeds.
- Plant thoroughly cleaned seed. Avoid dense stands of canola.