



DISEASES OF BENGAL GRAM CROP

Session-5
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MAJOR DISEASES BENGAL GRAM (*Cicer arietinum*)

FUNGAL DISEASE	
WILT	<i>Fusarium oxysporum f.sp. ciceri</i>
RUST	<i>Uromyces ciceris-arietini</i>
ASCOCHYTA BLIGHT	<i>Ascochyta rabiei</i> (Perfect stage: <i>Mycosphaerella pinodes</i>)
STEM AND ROOT ROT OR DRY ROOT ROT	<i>Rhizoctonia bataticola</i> (Pycnidial stage: <i>Macrophomina phaseolina</i>) (Sexual stage: <i>Thanatephorus cucumeris</i>)
GREY MOULD	<i>Botrytis cinerea</i>
BACTERIAL DISEASE	
SEEDLING ROT AND LEAF BLIGHT	<i>Xanthomonas campestris pv.cassiae</i>



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SYMPTOMS
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WILT

- The disease occurs at two stages of crop growth, seedling stage and flowering stage or adult stage.
- The field symptoms of wilt and death of seedlings or adult plants in patches.
- In field plants show typical symptoms of wilting, i.e., drooping of petioles, rachis and leaflets followed by sudden death of plant.
- All the leaves turn yellow and then light brown and droop prematurely.
- **Vascular discolouration** is observed on longitudinal splitting of stem.
- Sometimes only a few branches are affected, resulting in partial wilt.
- Seedlings collapse and lie flat on the ground retaining their dull green colour.
- When split open or cut transversely, brown to black discolouration of the internal tissues can be seen.
- The infected plant easily pulled out than the normal plant.



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WILT SYMPTOM





PATHOGEN: *Fusarium oxysporum f.sp. ciceri*

• The fungus produces hyaline to light brown, septate and profusely branched hyphae.

Microconidia are oval to cylindrical, hyaline, single celled, normally arise on short conidiophores.

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- **Macroconidia** which borne on branched conidiophores, are thin walled, 3 to 5 septate, fusoid and pointed at both ends.
- **Chlamydospores** are rough walled or smooth, terminal or intercalary, may be formed singly or in pairs in chains.

DISEASE CYCLE

- The fungus may be **seed-borne and survives in infected plant debris in soil.**
- **The primary** infection is through chlamydospores in soil, which remain viable upto next crop season.
- The weed hosts also serve as a source of inoculum.
- The secondary spread is through irrigation water, cultural operations and implements.

FAVOURABLE CONDITIONS

- High soil temperature (Above 25°C), high soil moisture, monocropping and presence of weed hosts like *Cyperus rotundus*, *Tribulus terrestris* and *Convolvulus arvensis*.



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MANAGEMENT

- Treat the seeds with Carbendazim or Thiram at 2 g/kg or treat the seeds with *Trichoderma viride* at 4 g/kg or *Pseudonomas fluorescens* @ 10g/kg of seed.
- Apply heavy doses of organic manure or green manure.
- Follow 6-year crop rotation with non-host crops.
- Grow resistant cultivars like Kranthi (ICCC 37), Swetha (ICCV-2), ICCV 10, Avrodhi, G 24, C 214, BG 244, Pusa 212 and JG 315.



ASCOCHYTA BLIGHT

SYMPTOMS

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Strategic
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- All above ground parts of the plant are attacked.
- This disease is usually seen in flowering and podding time as patches of blighted plants in the field.
- On leaves, small water-soaked necrotic spots appear that enlarge rapidly under favourable conditions leading to blighting of leaves.
- On leaflets, the lesions are round or elongated, with grey centres surrounded by brownish margin
- In hot dry weather, the infection remains in the form of discrete lesions on the leaves, stems, pods and seeds.
- Similar spots may appear on the stem and pods.
- Pycnidia are observed on the blighted parts..
- The spots on the stem and pods have **pycnidia arranged in concentric circles as minute black dots.**
- **The stem** and petioles usually break at the point of infection due to girdling.
- If the main stem is girdled at the collar region, the whole plant dies.

PATHOGEN: *Ascochyta rabiei* (imperfect stage)

- **[Subdivision-Deuteromycotina,order-Sphaeriales,Family-Mycosphaerellaceae]**

Perfect stage: *Mycosphaerella pinodes*

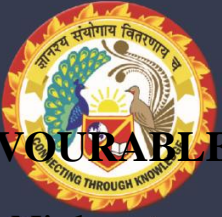
- **[Subdivision-Ascomycotina,order-Sphaeropsidales,Family-Sphaeropsidaceae]**

- The fungus produces hyaline to brown and septate mycelium.
- Pycnidia are spherical to sub-globose with a prominent ostiole.
- Conidia are borne on short conidiophores inside the pycnidia. They are hyaline, oval to oblong, straight or slightly curved and single celled, occasionally bicelled.



ASCOCHYTA BLIGHT SYMPTOM





FAVOURABLE CONDITIONS

- **Night** temperatures of 10°C and day temperature of 20°C, rains accompanied by cloudy weather and **excessive canopy** favour the disease spread.

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DISEASE CYCLE

- The fungus survives in the infected plant debris as pycnidia.
- The pathogen is also **externally and internally seed-borne**.
- **The primary spread is from seed-borne pycnidia** and plant debris in the soil.
- The secondary spread is mainly through air-borne conidia.
- Rain splash also helps in the spread of the disease.

MANAGEMENT

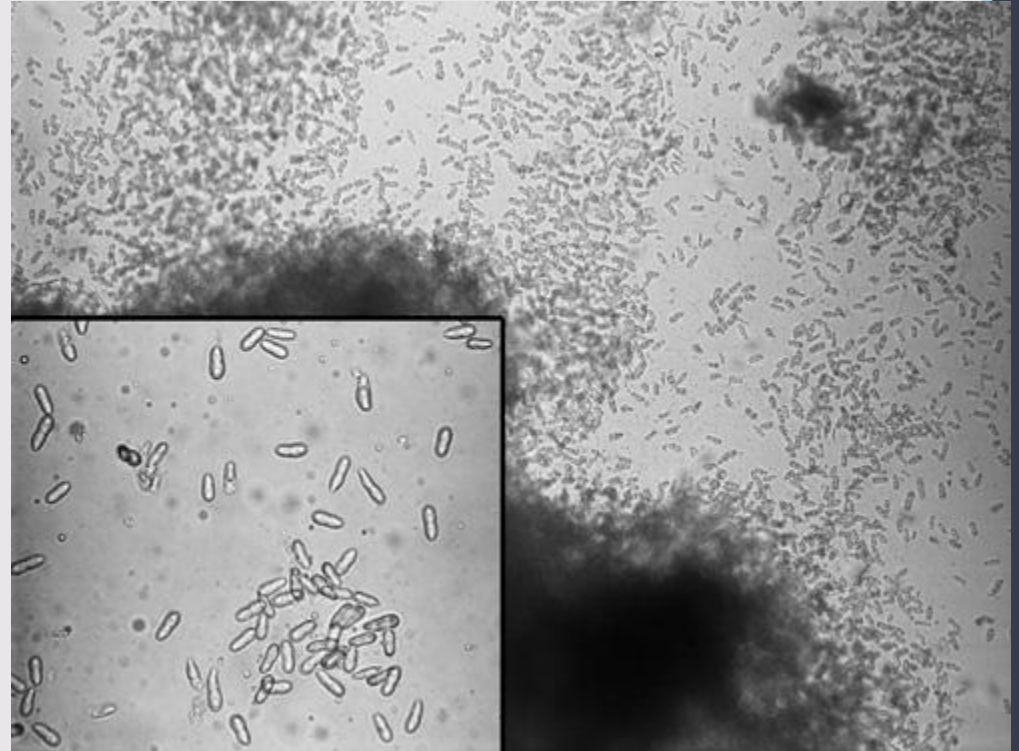
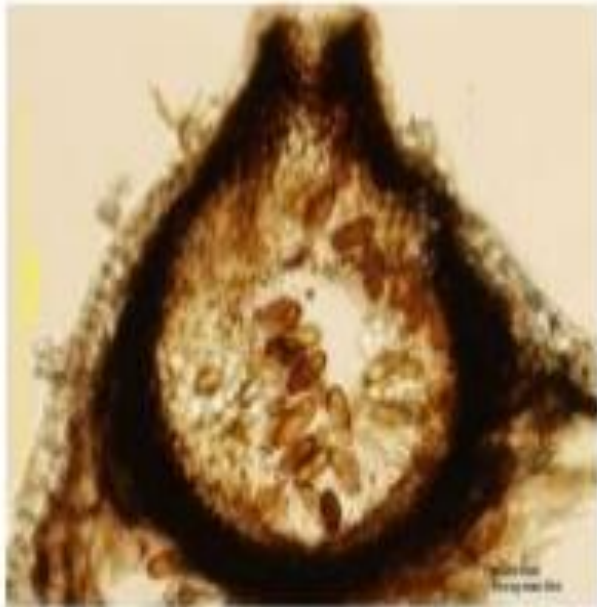
- Grow resistant/tolerant varieties like **Gaurav, C 235, G 543, GG 588, GG 688, BG 261** and GNJ 214.
- Remove and destroy the infected plant debris in the field.
- Follow crop rotation with cereals.
- Deep sowing of seeds, i.e., 15cm or deeper.
- Intercropping with wheat, barley and mustard.
- Treat the seeds with Thiram 2g or Carbendazim 2 g /kg.



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PYCNIDIA AND CONIDIA





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GREY MOULD

- Grey mould is most likely to first appear as a soft rot at the base of the stem in the collar region.
- The affected tissues become covered with a fluffy grey mould initially.
- As the disease progresses affected plants wither and die.
- Small black sclerotia may form on the surface of affected tissue when the plant dies.
- In older plants sometimes only a few branches on a plant are affected and the rest of the plant appears quite normal.
- Seedling infection can cause damping-off and considerable thinning of a crop.



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GREY MOULD





Causal organism: *Botrytis cinerea*

Sub-division: *Deuteromycotina*

Disease cycle

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- **Primary infection:** The fungus survives on infected seed, as a saprophyte on decaying plant debris and as soil-borne sclerotia.
- **Secondary infection:** These fungal spores can be carried from plant to plant by air currents and spread the disease rapidly.

Favourable conditions

- High soil temperature (Above 25⁰C), high soil moisture, monocropping and presence of weed hosts like *Cyperus rotundus*, *Tribulus terrestris* and *Convolvulus arvensis*.



Management

- Treat the seeds with Carboxin + Thiram (Vitavax power) at 2 g/kg or treat the seeds with *Trichoderma viride* at 4 g/kg or *Pseudomonas fluorescens* @ 10g/kg of seed.
- Apply heavy doses of organic manure or green manure.
- Follow 6-year crop rotation with non-host crops.

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