



# **DISEASE OF FIELD AND HORTICULTURAL CROPS – I**

## **SESSION 13 SOYBEAN DISEASES**

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# Important Diseases

## ❖ Major Diseases

1. RAB - *Rhizoctonia solani*
2. Rust - *Phakospora pachyrhizi*
3. Bacterial Pustule - *Xanthomonas axonopodis pv glycines*
4. Soybean Mosaic - *Soybean mosaic virus*

## ❖ Minor Diseases

1. Anthracnose & Podblight - *Colletotrichum truncatum*
2. Frog eye leaf spot - *Cercospora sojina*
3. Charcoal rot - *Macrophomina phaseolina*
4. Seedling blight - *Fusarium, Pythium, Rhizoctonia, etc*
5. Bacterial blight - *Pseudomonas syringae pv glycinea*
6. Yellow mosaic - *Begomovirus*

# RHIZOCTONIA AERIAL BLIGHT

*Rhizoctonia solani*

## ❖ Symptoms

1. Leaf spot, leaf blighting, defoliation and cobweb like mycelium
2. Water soaked lesions, turning reddish brown with dark margin
3. Lesions coalesce to cause leaf blighting and defoliation
4. Cobweb like mycelium and sclerotia on infected leaves
5. Lesions – also on petiole, stem and pods





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# Etiology

- ❖ Hyphae - branching at right angle; constriction at the point of origin of hyphae
- ❖ Sclerotia - grayish white, later brown or grayish black, sub globose to slightly flattened in shape and vary from 0.5 to 5 mm



## ❖ Disease cycle

- ✓ Primary inoculum - Soil borne sclerotia
- ✓ Transmission - Mycelium

## ❖ Favourable Conditions

- ✓ Hot ( $T > 30\text{ }^{\circ}\text{C}$ ) and Humid weather ( $\text{RH} > 90\%$ )
- ✓ Mature plants are more susceptible

## ❖ Management

1. Moderately resistant variety – PK-416, PS-1556, etc
2. Field sanitation
3. Crop rotation
4. Deep summer ploughing
5. Green manuring and application of neem cake @ 2.5t/ha
6. Soil application of *Trichoderma* enriched FYM (5t/ Ha)
7. Seed treatment
  - i) *Trichoderma viridae* @ 10g/Kg seeds
  - ii) Thiram @ 3g/kg
8. Foliar spray :
  - i) Pyraclostrobin @ 1ml/L
  - ii) Pencycuron @ 1ml/L
  - iii) Propiconazole @ 1ml/L
  - iv) Azoxystrobin @ 1ml/L

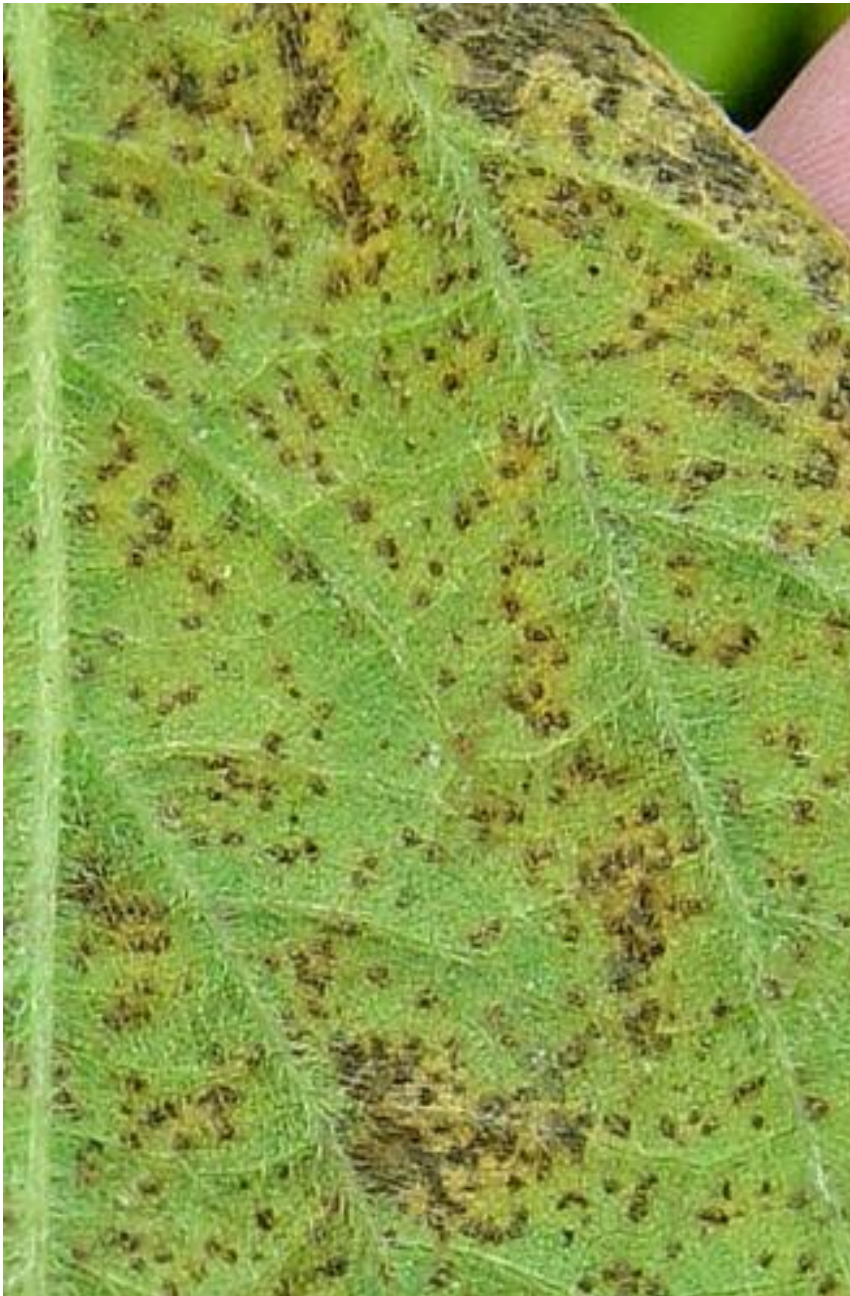


# Rust

❖ *Phakospora pachyrhizi*

❖ **Symptoms**

1. On all above ground parts
2. Initially – Light brown pustules on lower surface; Turn reddish brown
3. Pustules coalesce and cause defoliation



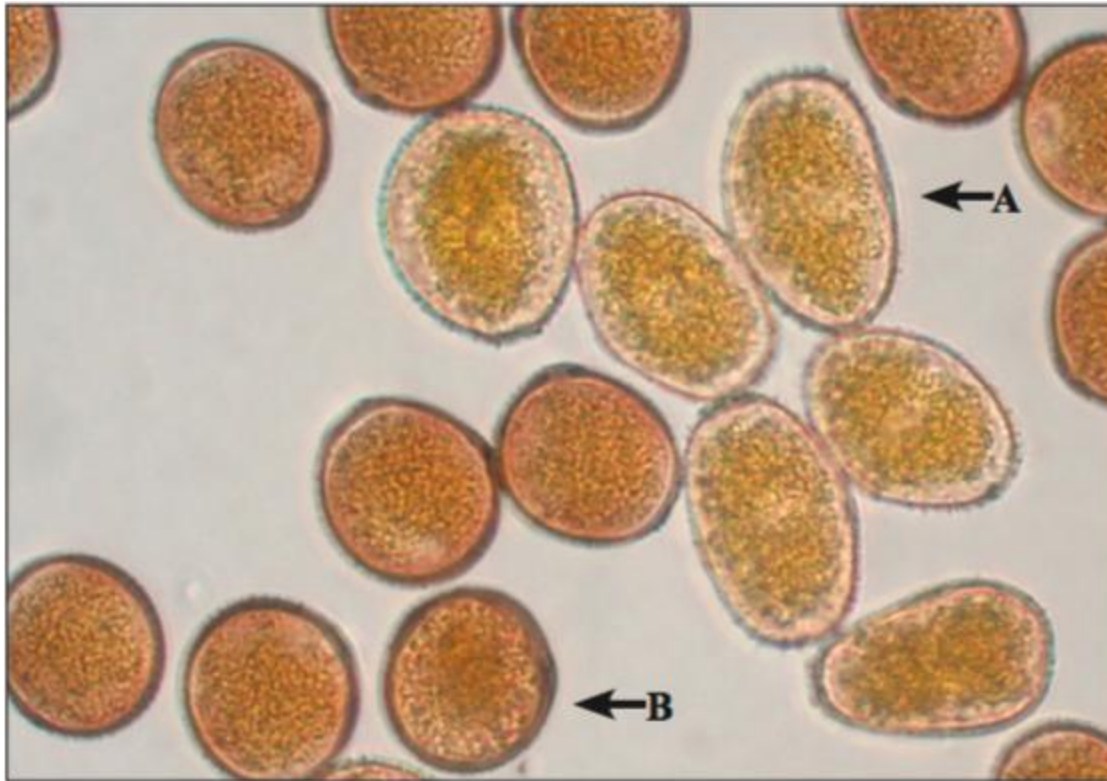
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# Etiology

- ❖ Uredospores – One celled, Yellowish brown
- ❖ Teliospores - One celled, Chocolate brown





## Disease cycle

- ❖ **Primary infection** – Teliospores in crop debris
- ❖ **Secondary infection** – Air borne uredospore

## Favourable condition

- ❖  $T \sim 20\text{ }^{\circ}\text{C}$ ;  $\text{RH} \sim 80\%$

# Management

1. Resistant varieties – Ankur, PS-1024, Dsb-34
2. Field sanitation
3. Crop rotation
4. Split application of nitrogenous fertilizers
5. Fungicides
  - i) Oxycarboxin @ 0.1%
  - ii) Propiconazole @ 0.1%

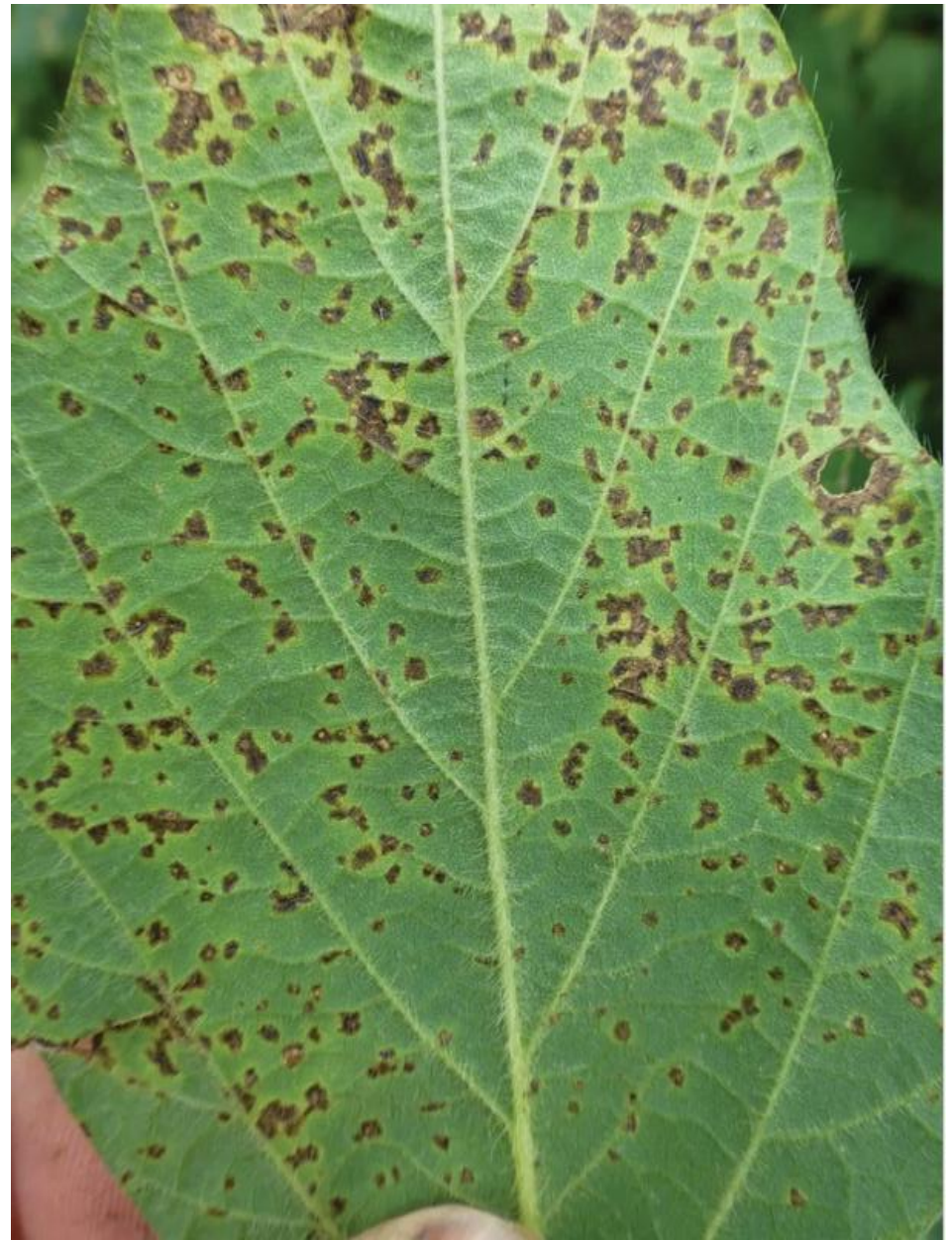


# Bacterial Pustule

❖ *Xanthomonas axonopodis pv glycines*

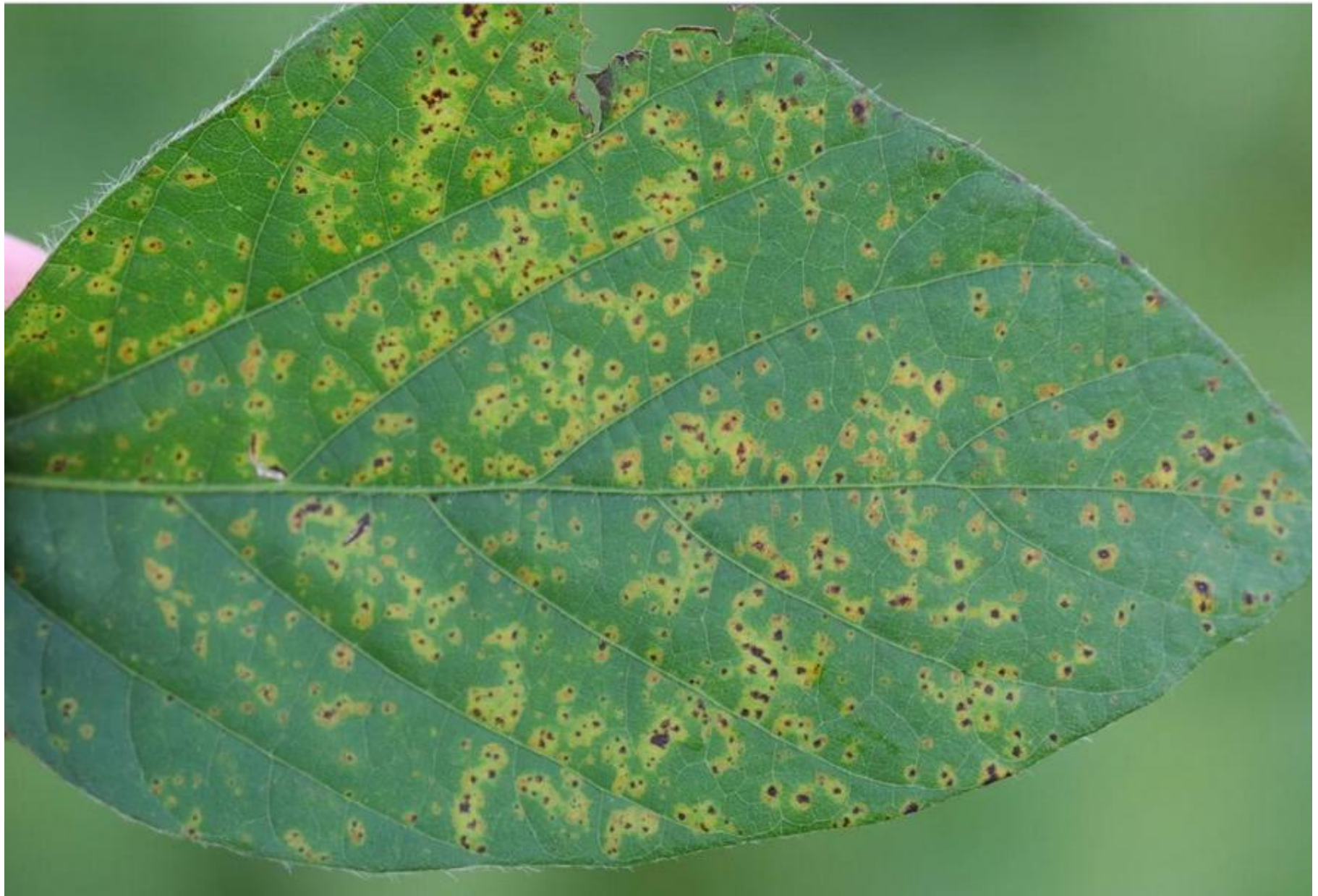
## ❖ Symptoms

1. Tiny light green spots with elevated center
2. They enlarged into light brown pustules with yellow hallow
3. Several pustules coalesce to cause defoliation
4. Raised reddish brown pustules on pods



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## Etiology

- ❖ *Xanthomonas* - Gram –ve, Single polar flagellum

## Disease Cycle

- ❖ **Primary inoculum** – Crop debris, seeds
- ❖ **Secondary infection** – Rain splashes, Wind

## Favourable condition

- ❖ Hot humid weather with frequent rains

# Management

❖ Crop rotation

❖ Field sanitation

❖ Use disease free seeds

❖ Seed treatment

1. *Pseudomonas fluorescence* @ 10g/kg seeds

2. Streptocyclin 300 ppm

❖ Foliar spray

1. *Peudomonas fluorescence* @ 10g/L

2. Streptocyclin 3 g + COC 30 g per 10L of Water



# Soybean Mosaic

❖ *Soybean mosaic virus*

## ❖ Symptoms

1. Leafs are malformed with mosaic pattern on the leaves
2. Leaf crinkling and margins rolled backwards
3. Blisters form in severely infected leaves
4. Pod setting reduced
5. Seeds – small, malformed, discoloured
6. Severe stunting







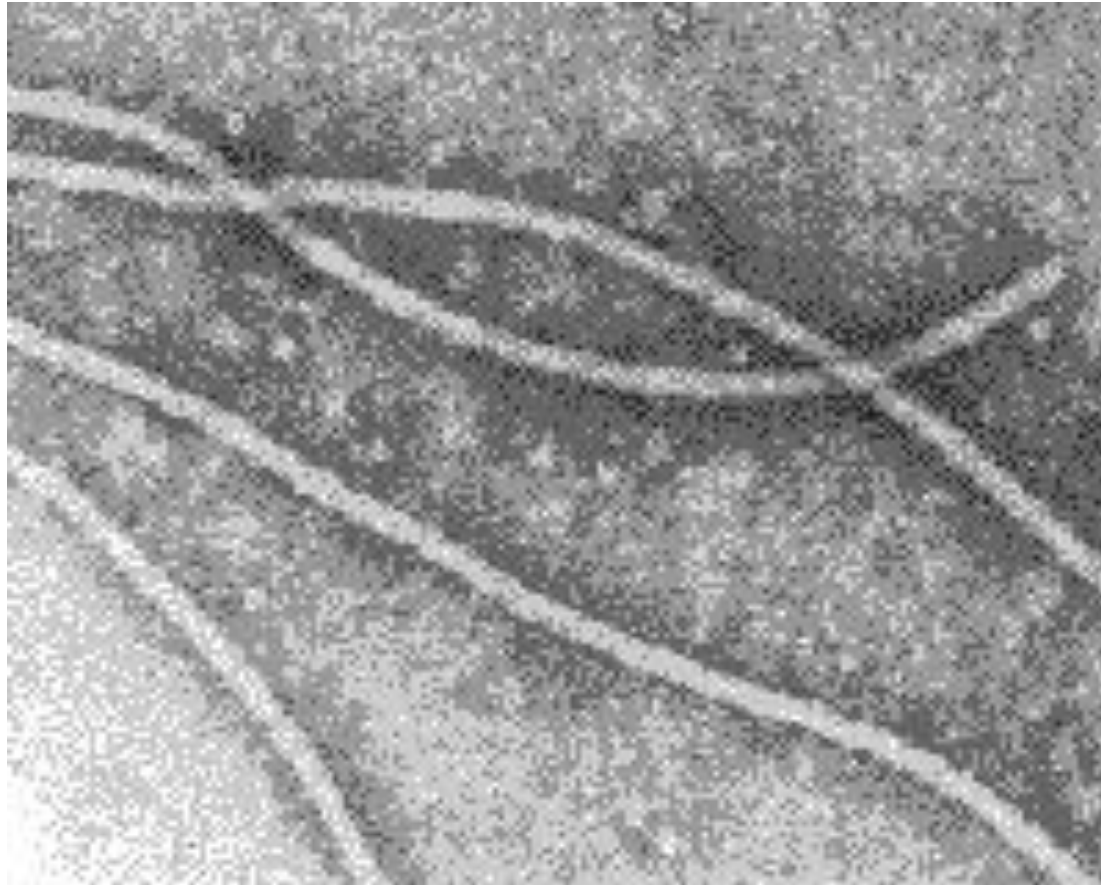
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# Etiology

❖ *Potyvirus* - ssRNA, Filamentous





# Disease Cycle

❖ **Primary inoculum** – Seeds

❖ **Secondary infection** – Aphids (*Aphis gossipi*, *Myzus persicae*)





# Management

- ❖ Resistant/Moderately resistant varieties – PS-24, PS-25
- ❖ Field sanitation
- ❖ Roughing
- ❖ Disease free seeds
- ❖ Seed treatment – Imidachlorprid 3ml/kg
- ❖ Foliar spray
  - NSKE 5%
  - Imidachlorprid @ 3ml/10L

# Seedling Blight

❖ *Fusarium*, *Pythium*, *Rhizoctonia*, etc

## ❖ Symptoms

1. Seed rot
2. Pre/Post emergence damping off
3. Root rot and wilt



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# Bacterial Leaf Blight

❖ *Pseudomonas syringae* pv *glycinea*

## ❖ Symptoms

1. Water soaked lesions
2. Turn into necrotic angular lesions with yellow halo
3. Lesions merge to cause blighting and defoliation





# Yellow mosaic

❖ *Begomovirus*; Vector – *Bemisia tabaci* (Whitefly)

## ❖ Symptoms

1. Small yellow flecks
2. Flecks enlarge into typical yellow mosaic on the leaves
3. Stunting and reduced pod formation

