



# **DISEASES OF TOBACCO** ***(NICOTIANA TABACUM)***



**DFHCM**

**CREDIT HOUR:2+1**

# MAJOR DISEASES OF TOBACCO

<b>FUNGAL DISEASE</b>	
<b>BLACK SHANK</b>	<i>Phytophthora parasitica var. nicotianae</i>
<b>DAMPING OFF</b>	<i>Pythium aphanidermatum</i>
<b>FROG EYE SPOT</b>	<i>Cercospora nicotianae</i>
<b>BLACK ROOT ROT</b>	<i>Thielaviopsis basicola</i>
<b>POWDERY MILDEW</b>	<i>Erysiphe chicoracearum var. nicotianae</i>
<b>BACTERIAL DISEASE</b>	
<b>ANGULAR LEAF SPOT</b>	<i>Burkholderia solanacearum</i>
<b>VIRAL DISEASE</b>	
<b>MOSAIC</b>	<i>Tobacco Mosaic Virus (TMV) or Nicotiana virus I</i>
<b>LEAF CURL</b>	<i>Tobacco leaf curl virus or Nicotiana Virus 10 (Ruga tabaci)</i>
<b>PHANEROGAMIC PARASITE</b>	
<b>OROBANCHE OR BROOM RAPE</b>	<i>Orobanche cernua var. desertorum</i>

# BLACK SHANK

## ECONOMIC IMPORTANCE

- It is a common disease of tobacco in many parts of India, particularly in the areas with heavy rainfall.

## SYMPTOMS

- The pathogen may affect the crop at any stage of its growth.
- Even though all parts are affected, the disease infects chiefly the **roots and base of the stem.**
- In the transplanted crop, the disease appears as **minute black spot on the stem, spreads** along the stem to produce irregular black patches and often **girdling occurs.**
- **The upward** movement leads to development of **necrotic patches on the stems.**
- **The infected tissues** shrink, leaving a **depression and in advanced condition the stem shrivels and plant wilts.**
- When the affected stem is split open, the pith region is found to be dried up in **disc-like plates showing black discolouration.**
- **On the leaves large water soaked spots appear** during humid weather, which enlarge to blight the leaves.
- Seedlings in the nursery show **black discoloration of the stem near the soil level and** blackening of roots, leading the wet rot in humid condition and seedling blight in dry weather with withering and drying of tips.
- The pathogen also spreads to the leaves and causes blighting and drying of the bottom leaves.

# BLACK SHANK SYMPTOM



## **PATHOGEN: *Phytophthora parasitica* var. *nicotianae***

- The fungus produces hyaline and non-septate mycelium.
- The **sporangia, which are** hyaline, thin walled, ovate or pyriform with papillae, develop on the sporangiophores in a sympodial fashion.
- Sporangia germinate to release **zoospores which are usually kidney** shaped.
- The fungus also produces globose and thick walled **oospores**.
- **Oospores** are thick walled, globose, smooth and light yellow coloured.

## **DISEASE CYCLE**

- The fungus lives as a saprophyte on organic wastes and infected crop residues in soil.
- The fungus also presents in the soil as dormant mycelium, oospores more than 2 years.
- The primary infection is by means of **oospores** in the soil.
- Secondary spread is by **sporangia or zoospores disseminated by wind or** water.
- The pathogen in the soil spreads through irrigation water, transport of soil, farm implements and animals.

## **FAVOURABLE CONDITIONS**

- Frequent rainfall, high soil moisture and high population of root knot nematodes, *Meloidogyne incognita*, favours the disease.

## **MANAGEMENT**

- Collect and burn plant residues and debris.
- Select disease free seedlings for transplanting.
- Remove and destroy the affected plants in the field.
- Spot application of Bordeaux mixture@0.2% or copper oxy chloride@0.2% or metalaxyl@0.2% in planting points offer good protection.
- Burn the seed beds with paddy husk or groundnut shell at 15-20 cm thick layer.
- Provide adequate drainage in the nursery.
- Leaf blight and black shank phases of the disease can be effectively managed by two sprays of metalaxyl@0.2% or 3-4 sprays of copper oxy chloride@0.2%.

# BLACK ROOT ROT

## Symptoms

- Some early symptoms of black root rot include yellowing of foliage, marginal leaf scorch and overall plant decline.
- Black root rot may be mistaken for a nutrient deficiency.
- Infected herbaceous plants wilt rapidly during the hottest part of the day and recover during the evening hours.
- Branches may die back, and the entire plant may eventually die.
- Root systems are reduced to roots that are short, stubby, black and decayed.

## Causal organism:

*Thielaviopsis basicola* (Sub-division: Deuteromycotina)

# BLACK ROOT ROT OF TOBACCO





## **Disease cycle**

Primary infection – Chlamyadospores present in soil

Secondary infection – Irrigation water and insects

## **Favourable condition**

High temperature favours the disease development.

## **Management**

- Soil drenching and Spray Carbendazim + Mancozeb @ 0.2%.

# MOSAIC

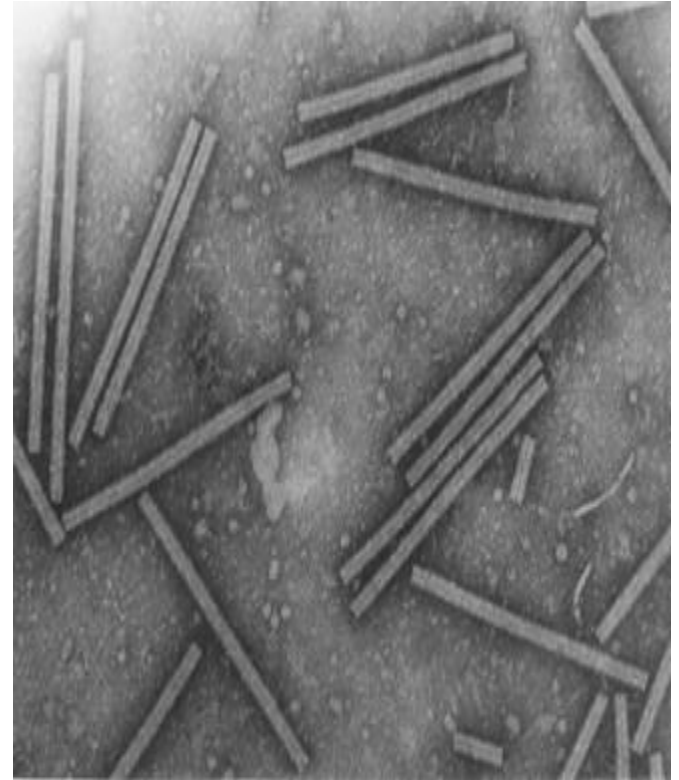
## ECONOMIC IMPORTANCE

- Mosaic is the most important and very common virus disease on tobacco in India appearing in every tobacco growing tract of the country.

## SYMPTOMS

- The disease appears as light discoloration along the veins of the youngest leaves.
- Soon the leaves develop a characteristic light and dark green pattern, the dark green areas are usually associated with the veins.
- The dark green areas later develop into irregular **blisters due to more rapid growth.**
- **The plants that become infected early in the season are** usually very much stunted with small, chlorotic, mottled and curled leaves.
- In severe infections, the leaves are narrowed, puckered, thin and **malformed beyond recognition.**
- Later, **dark brown necrotic spots develop under hot weather and this symptom is called “Mosaic burn” or “Mosaic scorching”.**

# MOSAIC SYMPTOM AND PATHOGEN



**PATHOGEN:** *Tobacco Mosaic Virus (TMV) or Nicotiana virus I*

- Tobacco mosaic is caused by *Nicotiana virus I (Marmor tabaci var. vulgare)*.
- *It is a rod shaped particle measuring 300 X 150-180µm with a central hollow tube of about 4µm diameter.*
- It is made up of centrally placed Ribonucleic acid molecules (SSRNA) **covered** with a protein coat.
- It is capable of remaining infective when stored dry for over 50 years.
- The thermal inactivation point (TIP) of the virus is 90°C for 10 minutes.

**DISEASE CYCLE**

- The virus has a wide host range, affecting nearly 50 plant species belonging to nine different families.
- Virus produces different types of symptoms on several species of *Nicotiana*, *tomato*, *brinjal*, *chilli*, *Datura stramonium*, *Solanum nigrum* and *Petunia*.
- **The** virus is sap-transmissible and enters the host through wounds.
- The virus is not seed transmitted in tobacco but tomato seeds transmit the virus.
- In the field, the virus is transmitted by contact.
- The farm workers engaged in topping and clipping operations transmit it through their dresses, chewing tobacco and snuff to the standing crop.
- The implements used in the field also transmit the virus.

# MANAGEMENT

- Remove and destroy infected plants.
- Keep the field free of weeds which harbour the virus.
- Wash hands with soap and running water before or after handling the plants or after weeding.
- Prohibit smoking, chewing and snuffing during field operations.
- Spray the nursery and main field with leaf extracts of *Bougainvillea* or *Basella alba* at 1 litre of extract in 150 litres of water, two to three times at weekly intervals.
- Adopt crop rotation by growing non-host plants for two seasons.
- Spray tannic acid 1% at 30th, 40th and 50th day after planting.
- Grow resistant or tolerant varieties like CTRI special (M.R), Jayasree (M.R), Virginia Tobacco 1158, **Prabhat, Gautami, Blankat 1, Godavari special, TMV RR-2, 3, 4, 6.**