Diseases of Brinjal

- 1. Phomopsis blight

Symptoms:

The plants are attacked at all stages of growth.

In nursery bed, it causes damping off which results from the infection of the seedlings at the collar portion just above the soil line. After transplanting, circular grey spots with light coloured centers appear on the leaves.

- In later stages, the lighter portion is studded with numerous black pycnidia.
- Affected leaves turn yellow and fall down pre-maturely.
- At the base of the stem, the fungus causes characteristic constrictions leading to canker development and toppling of the plants.
- On fruits, the disease manifests as pale sunken spots, which later enlarge and cover the entire fruit surface. A large number of dot like pycnidia also develop on such spots (Plate-1b). If infection of fruits takes place through calyx, the whole fruit becomes mummified due to dry rot.

Causal Organism: *Phomopsis vexans*(Sacc. and Syd.) Harter.

- **Disease cycle and epidemiology:**
  The pathogen is seed borne and also survives in plant debris both as mycelium and pycnidia.
- Seed infections directly lead to diseased seedlings.
- The pycnidiospores are disseminated through rain splashes, irrigation water, agricultural implements and insects.
- High relative humidity coupled with high temperatures is favourable for disease development.
- Pathogen grows best at a temperature of 21 – 32.5°C with a optimum temperature of 28 – 29°C. Storage rot is maximum at a temperature of 25°C.
- Maximum disease development takes place at about 26^{o}C under wet weather conditions.

Phomopsis blight

- **Management:**
  Cultural practices like collection and destruction of the diseased plant debris, crop rotation and use of disease free seeds are recommended to reduce the initial inoculum.
- Treat the seed with carbendazim (0.2%) or thiophenate methyl (0.2%). With the initiation of the disease, spray the crop with carbendazim (0.1%) or combination of mancozeb (0.25%) and carbendazim (0.05%) or copper oxychloride (0.3%) and repeat at 10 to 14 days interval.

2. FUSARIUM WILT

- **Symptoms:**
  The disease first appears in the field as yellowing of the lower leaves most commonly at the time of flowering stage.
- The affected leaves die prematurely and the symptoms continue to appear on successively younger leaves.
- One or more branches may be affected while the others remain symptom less.
- Browning of the walls of the vascular bundles follows rather promptly, and is best seen by cutting of stem or petiole and examining a cross section.

Causal Organism: *Fusarium oxysporum* Schlechtend f.sp.

FUSARIUM WILT

- **Disease cycle and Epidemiology:**
  The pathogen is soil borne in nature and overwinters in the infected plant debris and in the soil as mycelium and spore forms especially as chlamydospores.
- It spreads over small distances by means of water and contaminated farm equipments, and over long distances, primarily in infected transplants or in the soil carried with them.
- Usually, once an area becomes infested with *Fusarium*, it remains so indefinitely.
- The optimum soil temperature for disease development varies from 25-31 ◦C.
- Hot dry weather favour wilt development.
- The disease is more severe in acidic soils (5.6 to 6.5 pH) than in alkaline ones.
- Presence of root knot nematodes and monoculture enhance the disease further.
- Low nitrogen and high potassium levels in soil predisposes the plant to this disease.

- **Management**
  Follow careful crop rotation and use of healthy seed.
- Avoid movement of water from infected to healthy plants.
- Combined application of inorganic fertilizers and organic manures is considered effective in reducing disease incidence.
- Application of phosphate fertilizers and nitrate fertilizers help in reducing the wilt incidence whereas ammonium fertilizers increase disease development.
- Treat the seed with carbendazim (0.2%).
- Drench the affected plants with carbendazim/ benomyl (0.1%).
- Pseudomonas isolates from rhizosphere of different plants can also reduce infection.

3. Bacterial wilt

- **Symptoms**
  Characteristic symptoms of bacterial wilt on most of the hosts are sudden wilting and death of infected plants.
- Petioles of the older leaves of the infected plants droop down without yellowing.
- Leaves show epinasty symptoms accompanied by yellowing and stunting of whole plant.
- There is a typical browning of the vascular tissues of roots and stems
- Bacterial polysaccharides mechanically block the vascular system, which checks the translocation of water and minerals resulting in wilting of plants.
- Excessive development of adventitious roots may also take place in tomato.
- Cross sectioned part of the affected root or stem yield whitish milky bacterial ooze.

Bacterial wilt

Causal Organism: *Ralstonia solanacearum* (Smith) Yabuuchi *et al.*, 1995).

- **Disease cycle and epidemiology:**
  The pathogen is both soil and seed borne in nature and overwinters in infected plant parts, in potato tubers, in wild host plants and solanaceous weeds and can survive at least for 2 years in the absence of any host.
- Injured and decaying infected tissues release bacteria in the soil which enter plants through wounds occurring in roots due to cultural practices, nematodes and insects.
- Relatively high soil moisture and soil temperature favour the disease.

- **Management**
  Control of bacterial wilt in infested soil is very difficult as all the commercial cultivars are susceptible and no chemical control is available.
- Follow long crop rotation with non-solanaceous crops.
- Avoid the movement of water from infected plant to healthy plants.
- Shifting of date of transplanting to avoid period of high temperature, heavy rainfall or both.
- Green manuring or biofumigation with *Brassica* spp. may reduce the bacterial inoculum in soil.
- Bacterial antagonists such as *Pseudomonas fluorescens*, *P. glumae*, *P. cepacia* and *Bacillus* spp. have also been known to reduce disease incidence.
- Application of bleaching powder (15 kg/ ha) has also been found effective against this disease.
- The disease can also be controlled effectively if dazomet application is combined with soil solarization.
- Seedling dip in Streptocycline (100 ppm) for 30 minutes is also effective to some extent.
- Use resistant cvs./hybrids for cultivation.

4. Little leaf

- **Symptoms:**
  The disease is characterized by reduction in leaf size which has shortened petioles and leaf lamina (Plate-2).
- There is production of more number of branches and all this results in stunted and bushy appearance of the plants.
- The flowers are not produced but in case these are produced, that remain green.

Causal Organism: *Phytoplasma*

- **Disease cycle and epidemiology:**
  Phytoplasma perennates on weed hosts like *Datura* spp., *Vinica rosea* and several others.
- The disease is transmitted by grafting and through leaf hopper Hishimonas phycitis and Empoasca devastans but later is less efficient.
- **Management:**
  Destruction of weed hosts from in and around the field and control of vectors through application of insecticides is advocated.
- Dipping of seedlings in tetracycline (0.05%) before transplanting followed by soil application of Phorate (1kg/ha) also keeps the disease under check.