Diseases of Jute

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- Root & stem rot : *Macrophomina phaseolina*
- Powdery Mildew : *Oidium sp*
- Anthrcnose : *Colletotrichum corchorum*
- Stem Gall : *Physoderma corchori*
- Die-back (Black band disease): *Diplodia corchori*
- Wilting : *Rhizoctonia solani*
- Bacterial Leaf Spot :*Xanthomonas campestris pv. nakataecorchori*
- Bacterial wilt : *Pseudomonas solanacearum*
- Leaf mosaic
- Little leaf and bunchy top- Phytoplasma disease

ROOT & STEM ROT
Macrophomina phaseolina

- Occurs at all stages of crop growth
- On young seedlings:
  - ✓Dark, thin streaks on the collar region & also on cotyledon.
  - ✓During high humid condition, lesions enlarge & spread killing the seedling.
  - ✓Spread of the disease is so rapid , often called as damping off.

- On fairly grown up plants:
  - ✓Buff to black coloured lesion on the leaves along the margin and apex, on midribs and petioles.

Cont…

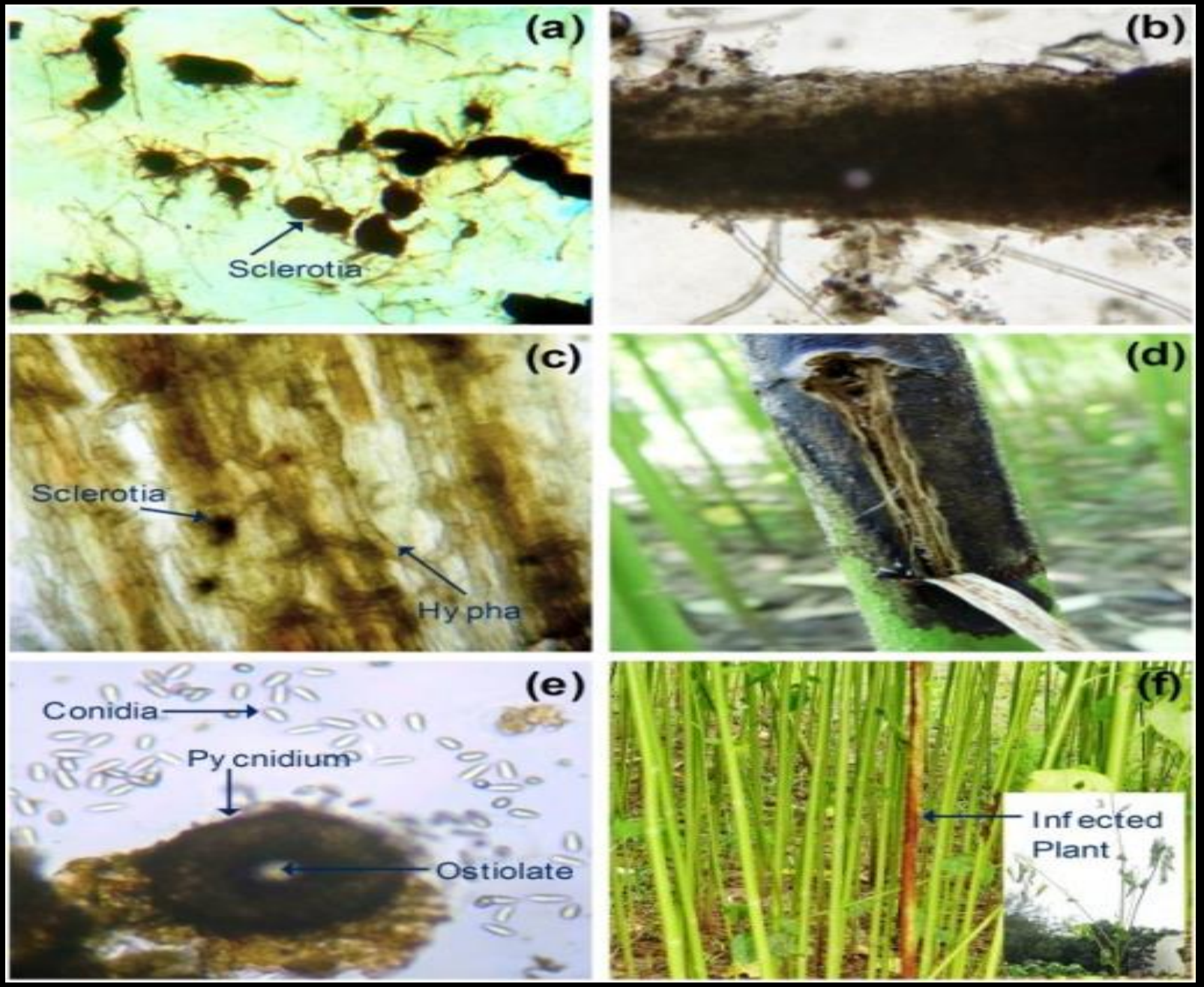
- As the disease advances, the fungus attacks the stem at nodal region, causing small dark brown to black lesions, enlarges to girdle the stem.
- Lesion spread along the stem causing bark shredding. Affected plants shows wilting and premature- defoliation.
- Disease spreads from basal stem to root, killing the plant.
- Pycnidia formed on the infected root & stem.

On inflorescence:

- Capsules are discoloured black, seeds discoloured & small. Sclerotia seen on the infected capsules.
- Disease is disseminated by seed, soil and air.
- Deshi and Tossa jute are infected by this disease.

Pathogen Characters

- Sclerotial stage: *Rhizoctonia bataticola*
- Wide host range: Potato, cotton, legumes, tobacco, sesamum, mulberry, egg plant. Survives all the year round.
- Defeciency of potassium in the soil has been found to increase the incidence of stem rot.


(a)
Sclerotia
(b)
(c)
Sclerotia
Hy pha
(d)
(e)
Conidia
Py cnidium
Ostiolate
(f)
Inf ected
Plant

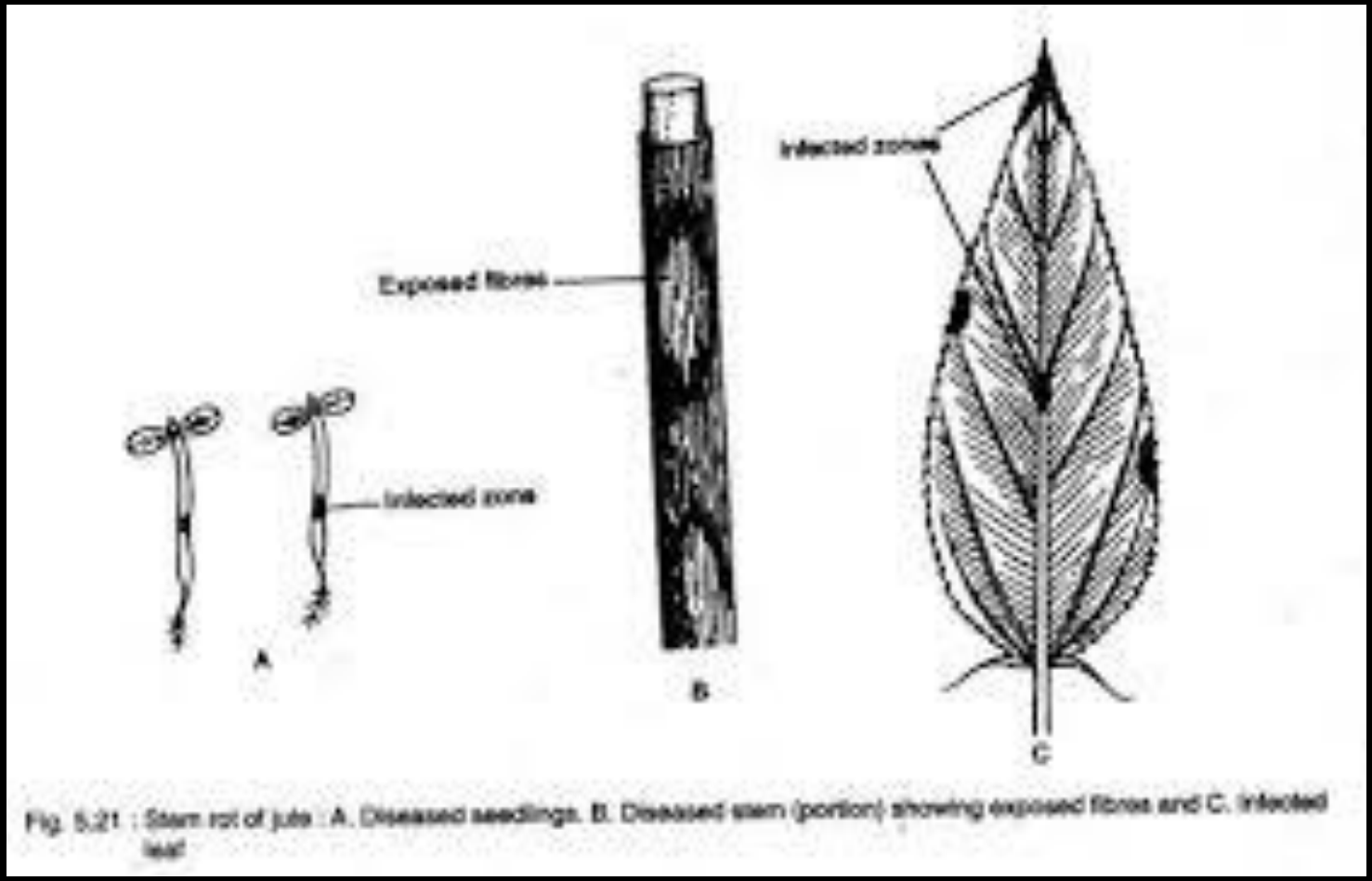


Fig. 5.21 : Stem rot of jute : A. Diseased seedlings. B. Diseased stem (portion) showing exposed fibres and C. Infected leaf

Management Practices

- Field sanitation and balanced fertilizer application.
- Burn the crop debris.
- Spray Dithane M-45 @ 18.56g/10 litres water.
- Spray Dithane M-45, Manner M-45 @ 2g/1litre H2O 2-3 times at the plant base soil.

Powdery Mildew
Oidium sp

- Powdery white to ash coloured growth on the leaves , later turn brown and wither.

- The diseased plants are usually weak & the quality of fibre is poor.

- Foggy weather is favourable for the growth

Anthracnose
Colletotrichum corchorum

- Yellowish brown water soaked lesions , depressed spots, on the stem which soon develops into characteristic irregular spots.
- Spot turn dark brown and finally black.
- Several spots coalesce- forms large patches , girdling of stem.
- Depending upon the depth of infection, the plant may wilt immediately or survive to produce pods.
- Necrotic lesion are produced on pods.

Cont…

- The fungus invades the vascular bundles, weakening the bast fibre bundles.
- Rapid spread and severe damage is during hot humid months of july- aug.
- With high humidity, acervuli are produced on the spots their characteristic bristles can be seen under hand lens.

Control measures:

- ✓ Seed treament with Provax-200 @ 4g/1 kg seed
- ✓ Crop rotation with rice, wheat etc.

Stem Gall
Physoderma corchori

- Symptoms appears first when the plant is about 8 – 10 inches high, producing small greenish galls on the lower portion of the stem, above the ground level.
- Galls gradually increase in size, turn dark brown crack at maturity.
- Sometimes several galls coalesce to form a large erupted lesion.
- Galls contains resting sporangia.

Physoderma corchori

- Pathogen produces rhizomycelium and intercalary swellings.
- Globose resting sporangia (smooth , dark brown exospores and thin , hyaline endospore.
- Infection sites remain restricted and the rhizomycelium penetrates to the xylem but not beyond.
- Fibre strands from infected plants are shattered at the base and discontinuous above that point.

Die-back (Black band disease): *Diplodia corchori*

- Discolouration of the tips of main shoots that preceeds gradual darkening and whithering of branches , which ultimately resemble blackened stocks. Innumerable , erumpent pycnidia, which extrude masses of spores are produced.

Control measures:

- ✓ Two times spray of Dithane M-45 @ 18.56g/10 litres water at the interval of 2-3 days.
- ✓ Crop rotation with deshi jute instead of tossa, Spraying of dithane M-45, Manner M-45 @ 2g/l litre water 2-3 times.

Wilting: *Rhizoctonia solani*

- Root system of affected plant becomes infested with a soil borne fungi.
- All the leaves become flaccid at a time and after few days dropping occurs.
- At the flowering stage, wilting occurs severely on jute plants.
- The *Olitorius* varieties are affected by this disease more than the Capsularis.
- Disease disseminated by seed and soil.

Control measures:

- ✓ The crop debris will be destroyed or burned.
- ✓ Crop rotaion will be maintained with Capsularis varieties
- ✓ Dithane M-45, Manner M-45 @ 18.56g/10 litres water.

Bacterial Leaf Spot
Xanthomonas campestris pv. nakataecorchori

- Small, dark green spots that turned brown. Spots often coalesced to form large necrotic areas in leaves, which turned yellow and dropped.
- Lesions on the stem surrounded by yellow border causes girdling and death of the .plant above the infected portion

- Circular , brown , Sunken lesions developed on capsules.

Bacterial wilt: *Pseudomonas solanacearum*

- Affected plants were stunted and become chlorotic before the leaves dropped. The root systems of plants with symptoms were seriously deteriorated .

- The causal bacterium,which produced short, Gram – negative rods with single, polar flagella, also caused wilting of several solanaceous crops.

Management:

- Avoid movement of infected plants or soil from around infected plants and to prevent surface water from running to other fields from fields .

- Jute should not be planted in rotation with susceptible , solanaceous crop plants.

Golden mosaic:

- Symptoms remained latent for a time,
- Mildly affected plants shows retarded growth, but flowering and pod production were nearly normal.
- Severely affected plants were noticeably stunted and eventually killed.

- Transmitted by grafting. No insect vector has been identified, but evidence of seed transmission of the disease, as well as transmission through pollen from infected plants, has been reported.

Control measures:

- ✓ Uprooting of infected plants
- ✓ Spraying of Heyzine/Hemithrin @ 15ml/10 litres water

  2-3 times with 7 days interval

Little leaf and bunchy top-A new phytoplasma disease in Jute

- In June 2012, symptom suggestive of phytoplasma disease were noticed in CRIJAF , Barrackpore.
- Incidence varied from 5- 20 %
- The infected plants showed profuse lateral branching with a bushy appearance.
- Branching at apical portion developed bunchy top symptom with tufts of smaller leaves.

Infected plant showing bunchy top and little leaf

Diseases of Sunnhemp

1. Rust : *Uromyces decoratus* Syd.
2. Wilt : *Fusarium udum* var. *crotalariae* (Kulkarni) Padwick.
3. Powdery mildew : *Leveillula taurica* (Lev.) Arn. and
   Oidium erysiphoides Fr.
   Golovinomyces cichoracearum
4. Root rot : *Rhizoctonia solani* Kuhn.
5. Anthracnose : *Colletotrichum curvatum* Briant and Martyn.
   Colletotrichum crotalaria
6. Leaf spot : Fungal sp.
7. Mosaic : *Sunnhemp mosaic virus.*
8. Phyllody of Sunnhemp caused by a mycoplasma.

Wilt : *Fusarium udum* var. *crotalariae*

- The affected plant gradually whither, droops, hang down and later on turn brown, and ultimately dies within a day or two.
- Usually the whole plant wilts but partial wilting is also noticed.
- In grown up plants the wilting parts droop at the tips and defoliation starts which consequently die.
- The sporodochium of the fungi with pinkish tinge are produced on the dead stem or the dead portion of the stem where the infection is confined to one side.
- The discolouration of the tissues could be traced to the main tap root or lateral roots.
- In the early stage the fungus is confined to the lateral roots especially in the tip portion and subsequently attacks the vascular bundle of meristem.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- The disease is caused by *Fusarium udum* (Bult) f.sp *crotalariae* (Kulkarni) earlier named as F. *vasinfectum* Atk. v. *crotalariae*, *Fusarium lateritium* f.sp. *crotalariae* (Padwick).

- As the pathogen is a **facultative parasite**, it survives in the crop stubbles.

- The pathogen produces pink coloured sporodochia on which enormous micro and **macro-conidia** are produced. Fungal hyphae and spores plug the xylem vessels of the infected part causing the death of the plant.

- **Microconidia** 1- celled, hyaline, mostly curved and scattered. Macroconidia is subulate, falcate, narrowed towards either end, 1-3 rarely 4-7 septate and pedicellate

Chlamydospores are 4-10µ in diameter, usually intercalary, ochre yellow, stroma mostly immersed, more or less spread out, plectenchymous, at first pale to pinkish, then salmon orange to cinnabarinous when dry.

Management

- Seed treatment with benlate @ 3 g ha-1 or spraying of carbendazim @ 3 g kg^{-1}
- soil application of neem cake along with seed treatment and application of $ZnSO_4$
- sowing of treated seeds with carbendazim @3 g kg^{-1} and Rhizobium and soil application of neem cake @1 q ha^{-1} + 25 kg $ZnSO_4$ ha^{-1}

Powdery mildew : *Leveillula taurica* (Lev.) Arn. and *Oidium erysiphoides* Fr.

Golovinomyces cichoracearum

Anthracnose : *Colletotrichum curvatum* Briant and Martyn. *Colletotrichum crotalaria*

- The disease makes an appearance in the form of soft discoloured areas on the cotyledon. Later, brownish spots are formed on all parts of host except underground parts.
- The affected seedling droops from the point below cotyledon.
- The affected cotyledons themselves drop from the petiole.
- The infection spreads downward and acervuli are formed with copious spores on the infected areas within two days.
- The young seedling when infected generally dies.

Anthracnose : *Colletotrichum curvatum* Briant and Martyn. *Colletotrichum crotalaria*

- When older plants are infected the disease is restricted on leaf and stem and the heavily infected leaves fall off.
- The spots on older leaves appear on one side of the leaf but gradually enlarge and extend to the opposite side.
- These spots are grayish brown to dark brown, roundish or irregular.
- Several spots coalesce and cover the entire leaves or large portion of the leaf.
- They may also be formed on the midrib. Along with the growth of seedlings the plant becomes resistant to the disease

Management

- Spraying: Spraying with Bordeaux mixture (0.5%) at seedling stage also reduces the disease incidence.
- Sowing time: As the disease is favoured by rain and high humidity early sowing in dry season i.e. mid-April to mid-May helps to escape this disease, because the crop becomes mature before the onset of monsoon.
- Resistance: Amongst the cultivated varieties, K-12 yellow was found to be largely resistant to the disease.
- Recently, a variety named SH-4 has been released, which is resistant against wilt under natural conditions.

Leaf blight - *Macrophomina phaseolina* (Tassi) Goid.

- The blight started from the margin of the leaf and proceeds inwards.
- Under moist and warm conditions with intermittent rains, the whole leaf may be blighted.
- But with the fall in temperature along with receding rains severity was restricted.
- Often black pinhead like fungal structure is noticed on blighted site.
- In the early morning, the blighted leaves look greyish and water soaked, which ultimately become brownish with broad yellow margin.
- Subsequently, the infected leaf becomes weak and droops down from the plant, which gives a sickly appearance of the whole field.

Leaf spots

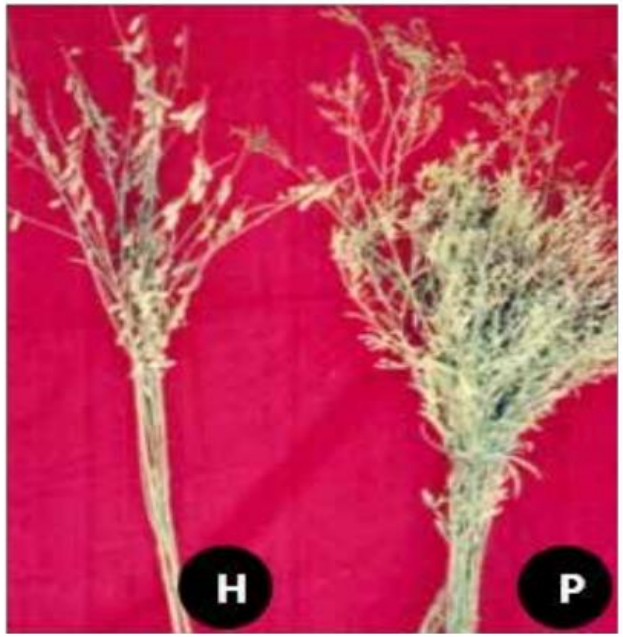
- ***Pleospora*** **leaf spot**
- ***Phoma*** **leaf spot**
- ***Pringsheimia*** **leaf spot**
- ***Cercospora*** **leaf spot**
- ***Choanephora*** **leaf blight and tip rot**

Sunnhemp mosaic virus.

Sunnhemp Phyllody

Healthy (H) and phylloid (P) inflorescence of sunnhemp

Healthy (H) and malformed (M) floral parts



Healthy (H) and phylloid (P) affected sunnhemp seed crop