



DISEASE OF FIELD AND HORTICULTURAL CROPS – I

**SESSION 4 &5
RICE DISEASES – 2**

Important Diseases

❖ Major Diseases

1. Blast - *Pyricularia oryzae* (T - *Magnaporthe grisea*)
2. Brownspot - *Bipolaris oryzae* (T - *Cochliobolus miyabeanus*)
3. Sheath Blight - *Rhizoctonia solani* (T- *Thanetophorus sasaaki*)
4. False Smut - *Ustilaginoidea virens* (T – *Claviceps oryzae sativae*)
5. BLB - *Xanthomonas oryzae* pv *oryzae*
6. Tungro - RTSV (*Waikavirus*) + RTBV (*Tungrovirus*)
7. Khaira disease - Zn deficiency

❖ Minor Diseases

1. Stem Rot - *Sclerotium oryzae*
2. Sheath Rot - *Saracladium oryzae*
3. Udbatta disease - *Ephelis oryzae*
4. BLS - *X. oryzae* pv *oryzicola*
5. Grassy stunt - *Tenuivirus*

False Smut

❖ *Ustilaginoidea virens* (*Claviceps oryzae sativae*)

❖ ~ Lakshmi disease

❖ Symptoms

1. Grains gets replaced by greenish spore balls (pseudomorphs)
2. Spores balls : Young- yellowish green ; Mature – Greenish black
3. Sporadic

Symptoms



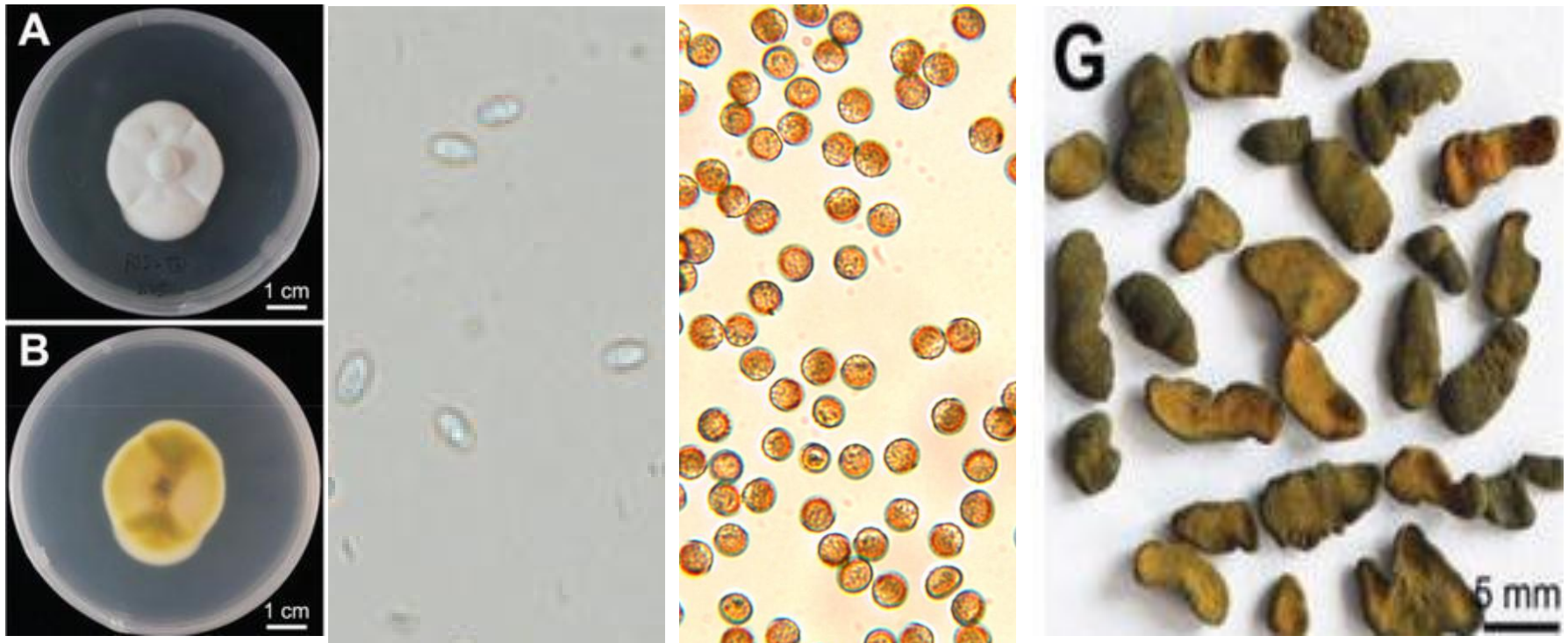
Symptoms



❖ Etiology

- ✓ *Ustilaginoidea* - Produce conidia and Chlamydozoospores
- Sclerotia

- ✓ *Claviceps*- Perithecia
(*Ascomycota* > *Sordariomycetes* > *Hypocreales* > *Claviceptacea*)



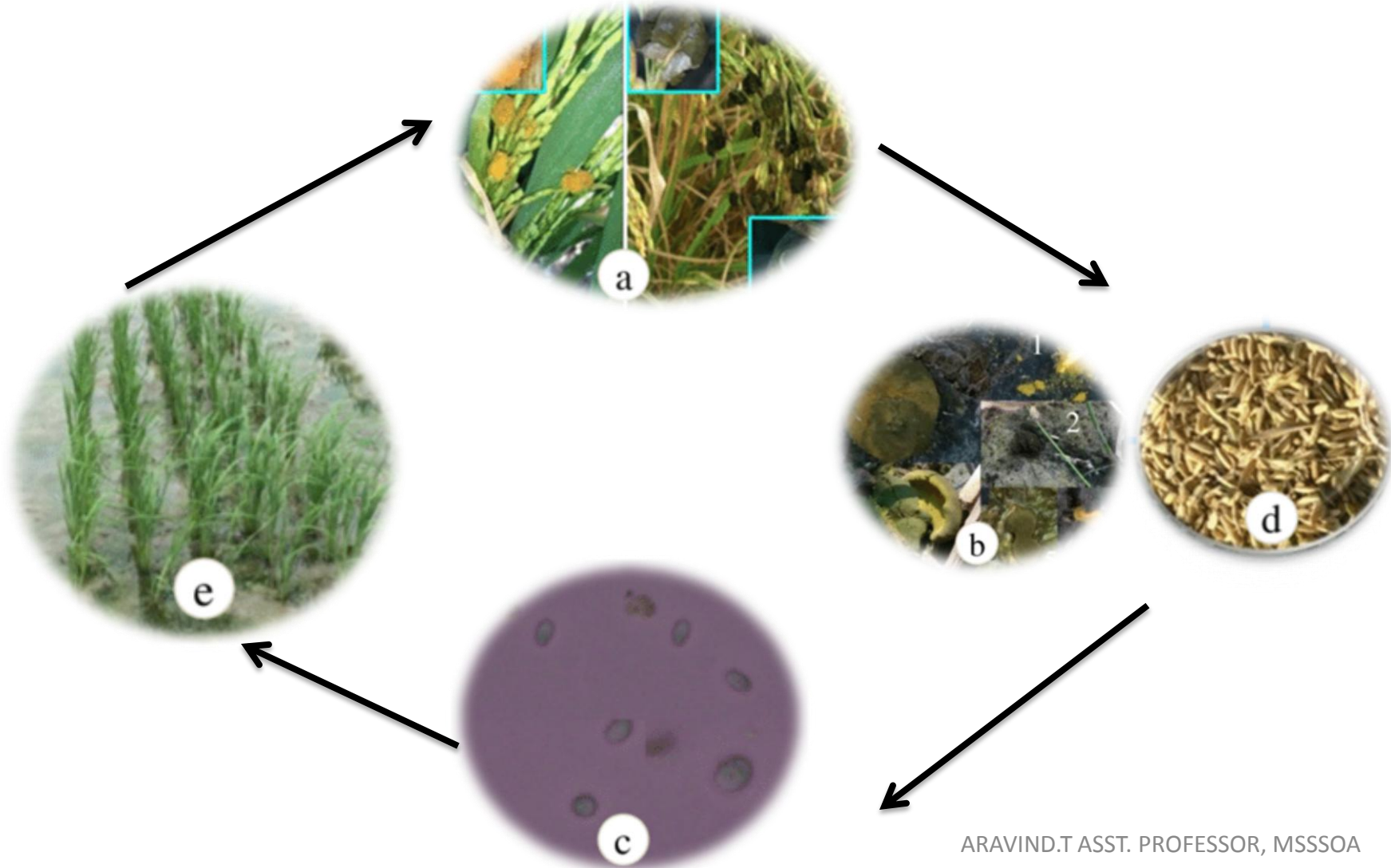
❖ Disease Cycle

Primary inoculum

- Sclerotia in seed (Contaminant) and soil

Secondary inoculum

- **Air borne conidia**



❖ Favourable Conditions

- ✓ **Weather**
 - Temperature ~ 28 °C
 - RH > 90%
 - Cloudy weather during flowering

❖ Management

1. Disease free seeds
2. Crop rotation
3. Field sanitation – Remove weeds, Crop residues
4. Split application of nitrogen fertilizer
5. Fungicides - Propiconazole 25% EC – 1 ml/ L
 - Fluopyram 17.7%+ Tebuconazole 17.7% - 1ml/L
 - Spray at Panicle emergence

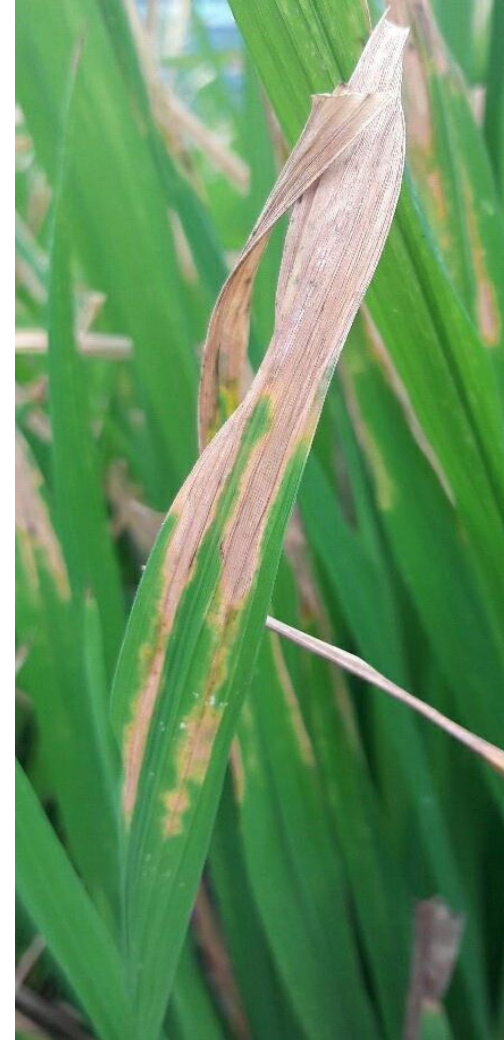
Bacterial Leaf Blight

❖ *Xanthomonas oryzae pv oryzae*

❖ Symptoms

1. Leaf Blight Phase
 - Linear to straw coloured stripes along the margin
 - Extend from tip downwards
 - Leaf blighting and death of plants
2. Kresek Phase
 - Systemic infection from seed
 - Sudden rolling up of leaves, drying and wilting

Leaf Blighting



Oozing



Kresek phase



❖ Etiology

✓ *Xanthomonas oryzae pv oryzae*

- Gram Negative
- Yellow coloured colonies
- Single polar flagellum



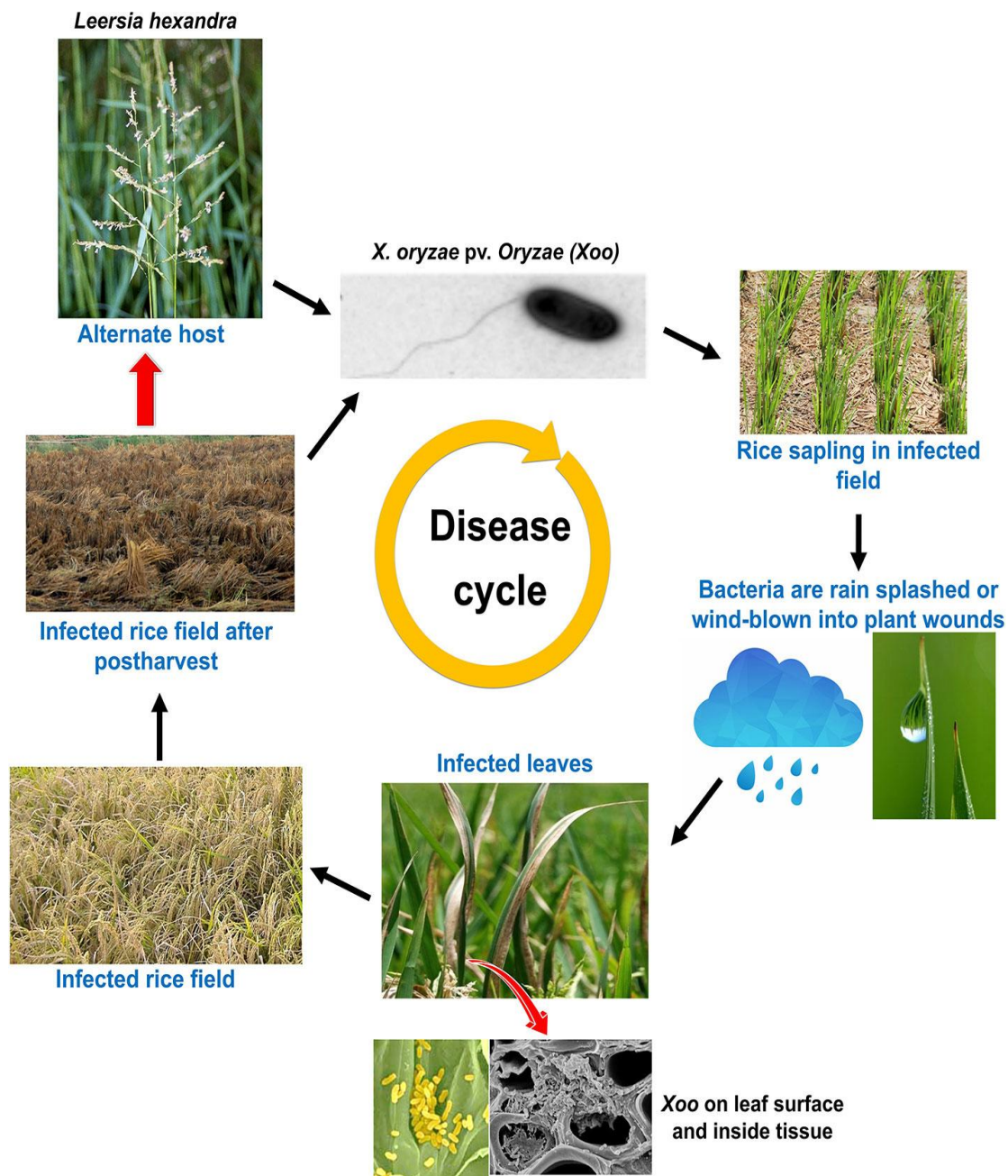
❖ Disease Cycle

✓ Primary inoculum

- Seeds, Volunteer plants, Wild grasses

✓ Secondary inoculum

- Rain splashes, Irrigation water



❖ Favourable Conditions

✓ Weather

- Temperature ~ 25 °C
- RH > 90%
- Cloudy weather rain and wind
- Leaf clipping

❖ Management

1. Resistant varieties- TKM-6, Ratna, **Improved Lalat, Improved Tapaswini**
2. Disease free seeds
3. Crop rotation
4. Field sanitation – Remove weeds, Crop residues
5. Split application of nitrogen fertilizer; Avoid leaf clipping
6. Seed Treatment
 - HWT- 53 °C for 30 min
 - Streptocyclin – 500 ppm
6. Addition of bleaching powder in irrigation water (5kg/ ha)
7. Spray : Streptocyclin 3g + COC30g in 10 L water

Rice Tungro

❖ *Rice tungro bacilliform virus*+ *Rice tungro spherical virus*

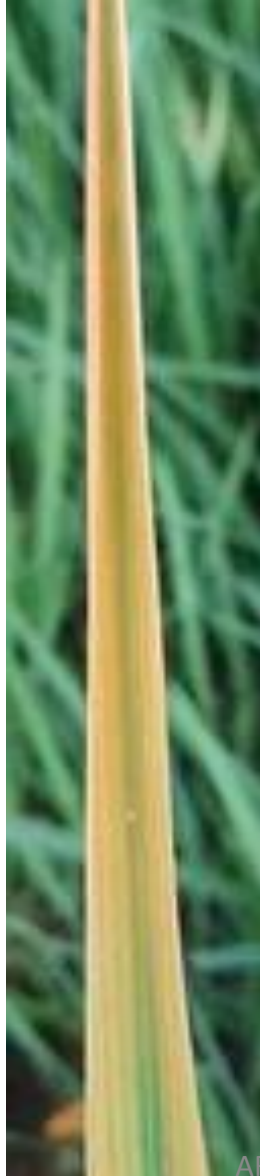
❖ ~ Cancer of Rice

❖ Word “tungro” – Degenerated growth

❖ Symptoms

1. Stunting and yellowing of plants
2. Mottling and rusty blotches on leaves
3. Leaves become twisted
4. Iodine test

Leaf Yellowing

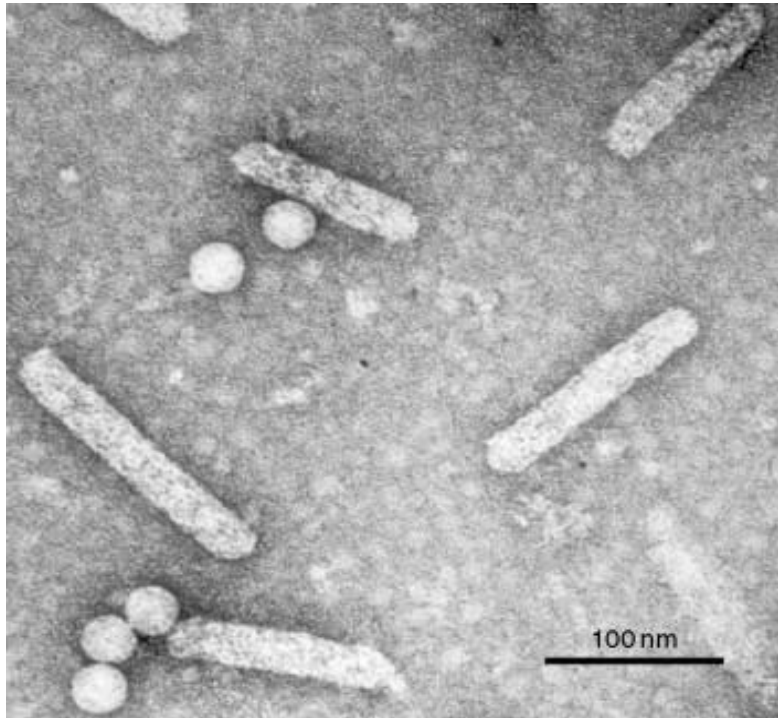


Field



❖ Etiology

- ✓ *Rice tungro bacilliform virus* - *Tungrovirus*; Rod shaped; dsDNA
 - Severe yellowing and stunting
 - Depend on RTSV for transmission
- ✓ *Rice tungro spherical virus* - *Waikavirus*; Isometric, ssRNA
 - Mild stunting
 - Independent transmission



❖ Disease Cycle

- ✓ Primary inoculum - Volunteer plants, Wild grasses
- ✓ Transmission - Green Leaf hoppers (Semi persistent)
 - *Nephotettix virescence* and *N. cinctipes*



❖ Favourable Conditions

✓ Weather

- Temperature ~ 25 °C
- RH > 90%
- Cloudy weather rain and wind
- Leaf clipping

❖ Management

1. Resistant varieties- **Basmathi-370, Ajay*, Phalguni***
2. Crop rotation
3. Field sanitation – Remove weeds, Crop residues
4. Split application of nitrogen fertilizer
5. Spray NSKE 5% - at 15 days interval
6. Spray - Dimethoate 30% EC- 2 ml/L
 - Imidachloprid 17.8% SL – 3ml/10L
7. Field application of Carbofuran 3G – 33kg/ ha

Khaira Disease

❖ Zn deficiency

❖ Symptoms

1. Seen 10-15 DAS
2. Interveinal chlorosis; white/yellow streaks on leaf base
3. Small brown/ bronze coloured spots on lower leaves
4. Spots merge to cause leaf drying
5. Stunting and browning of roots

❖ Management

1. Treatment of rice seed with 0.4% ZnSO_4 before sowing or of seedlings before transplanting gives control.
2. Spraying with 0.4% ZnSO_4 +2% urea on the appearance of the symptoms is useful

❖ Symptoms



❖ Symptoms



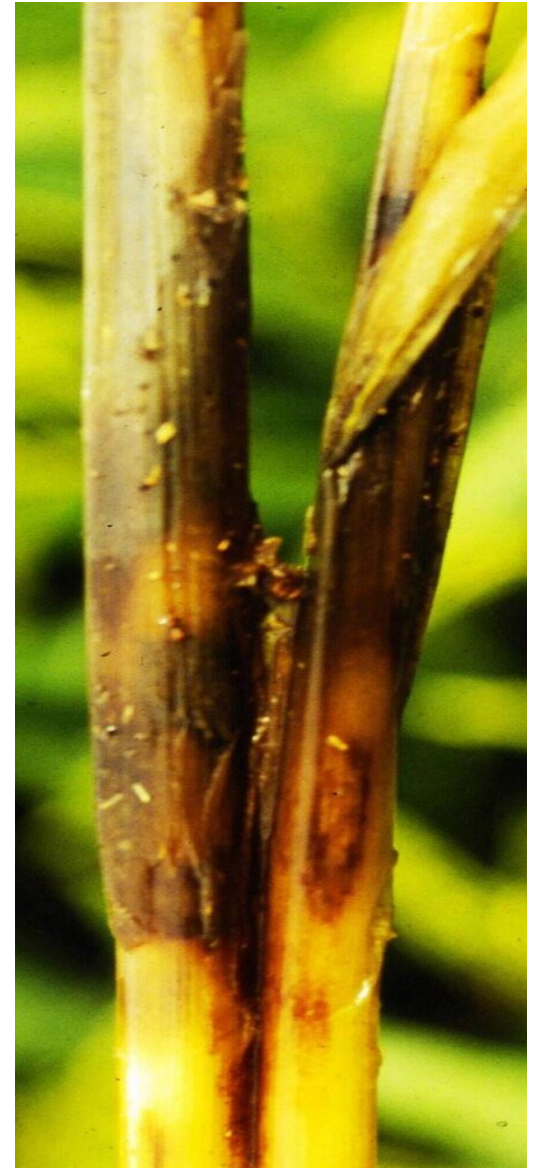
Stem Rot

❖ *Sclerotium oryzae*

❖ Symptoms

1. Excessive production of tillers
2. Small black lesions develop on outer leaf sheath near water line
3. Extensive rotting of leaf sheath

Symptoms

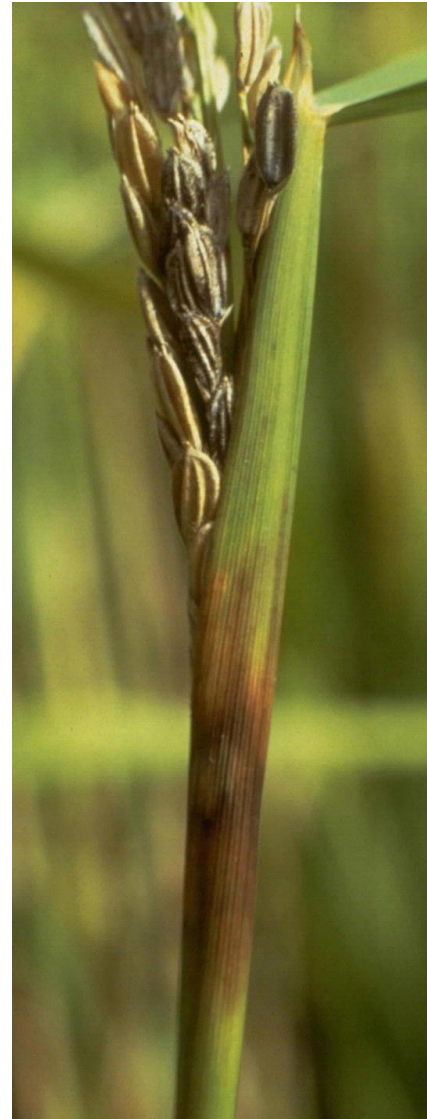


Sheath Rot

❖ *Saracladium oryzae*

❖ Symptoms

- Irregular lesions- dark reddish brown margins and gray center
- Lesions enlarge and often coalesce
- Young panicles to remain within the sheath
- Sheath rot completely

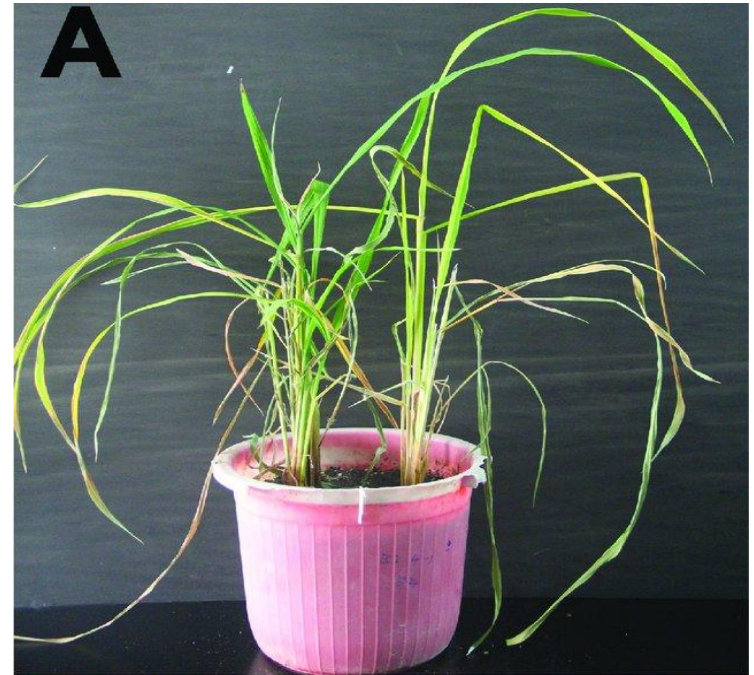


Foot rot

❖ *Fusarium moniliforme*
(*Gibberella fujikuroi*)

❖ Symptoms

1. Plants turn chlorotic and thin
2. Abnormally elongated;
3. Profuse branching of roots
4. Wilt and die



Symptoms



Udbatta Disease

❖ *Ephelis oryzae*

❖ ~ Agarbathi disease

❖ **Symptoms**

1. Panicle converted into dirty cylindrical structures



Bacterial Leaf Streak

❖ *X. oryzae* ov *oryzicola*

❖ Symptoms

1. Water soaked interveinal streaks turning yellow
2. Streaks coalesce to cause blighting



BLB vs BLS

