

RICE DISEASES

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Blast - *Pyricularia grisea*

Sexual stage : *Magnaporthe grisea*

Rotten neck, Rice seedling blight, Rice Fever

Symptoms

- 💣 **Leaf blast, node blast , neck blast and grain blast**
- 💣 **Typical leaf lesions are spindle shaped - wide in the center and pointed towards the end**
- 💣 **Large lesions usually develop gray centers with brown borders**
- 💣 **Nodal infection causes the culm to break at the infected node**
- 💣 **Few, no seeds, or whiteheads when neck is infected or rotten**



Leaf blast

Nodal blast

Neck blast

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Leaf blast



Node blast



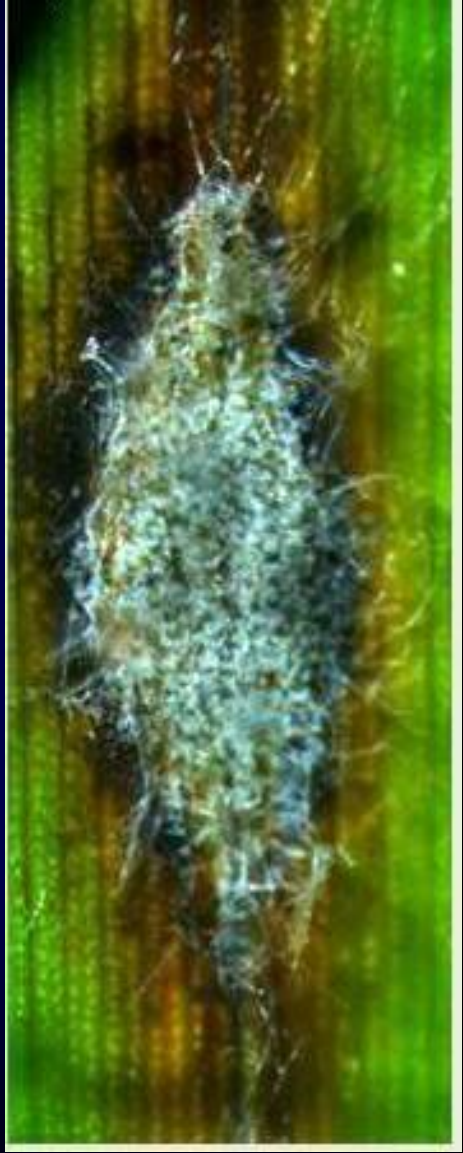
Collar blast



Neck blast

Leaf blast





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Neck Rot / Neck Blast / Panicle Blast / Rotten Neck



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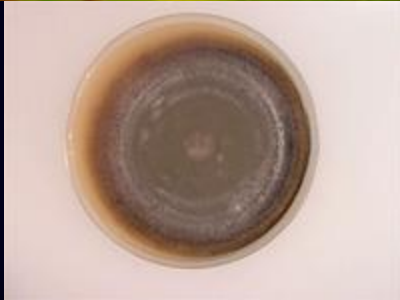


Nodal Blast



Grain Blast





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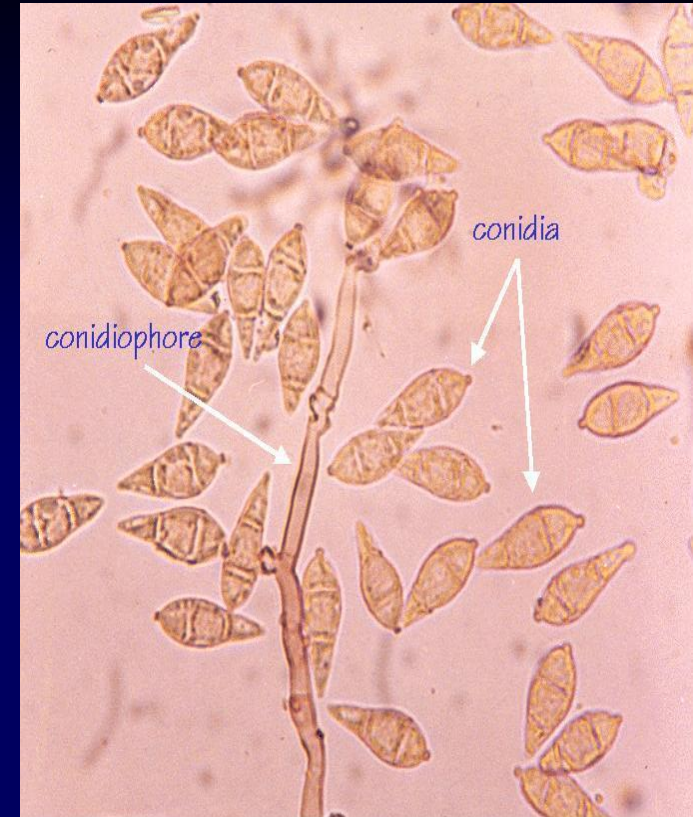
Favourable conditions

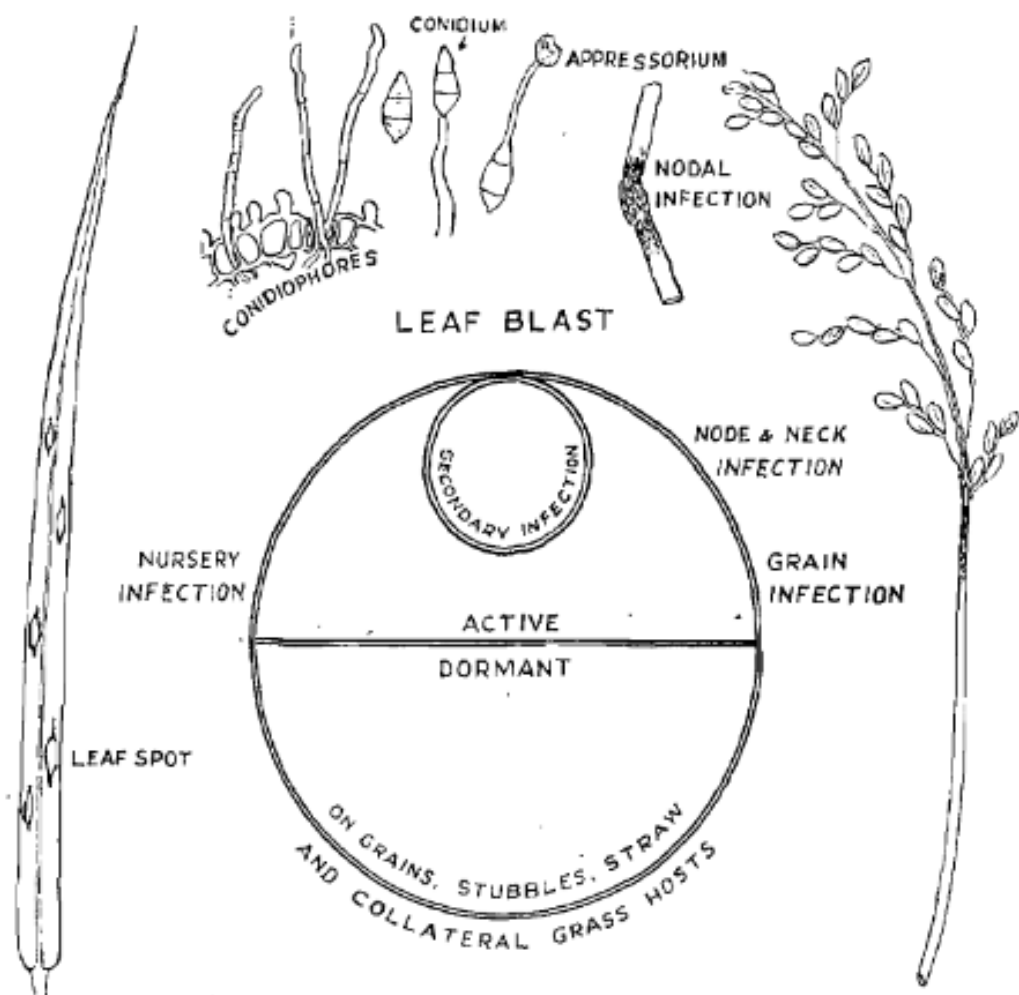
- ✿ presence of the blast spores in the air and weeds throughout the year
- ✿ cloudy skies, frequent rain, and drizzles
- ✿ high nitrogen levels
- ✿ high relative humidity and wet leaves

Management

Nursery

- ✿ Seed treatment with Carbendazim or beam 1g/Kg (1 g/l).
- ✿ Seed treatment with *Pseudomonas fluorescens* (Pf1) @ 10 g/kg of seed
- ✿ Spray Edifenphos 25 ml (or) Carbendazim 25g for 20 cents of nursery





LIFE CYCLE OF PIRICULARIA ORYZAE

For Main field

- 💣 **Delay top dressing of Nitrogen when infections are seen**
- 💣 **Flooding the field and weed management**
- 💣 **Spray *P. fluorescens* (Pf1) formulations @ 0.2% (1 kg)**
- 💣 **Spray Edifenpnos 500 ml or Tricyclozole 500 g /ha**
- 💣 **CO47 , IR20, ADT 36, ADT 39, Ponmaniand ASD 18 : resistant to blast**
- 💣 **IR 50 and White ponni – susceptible**

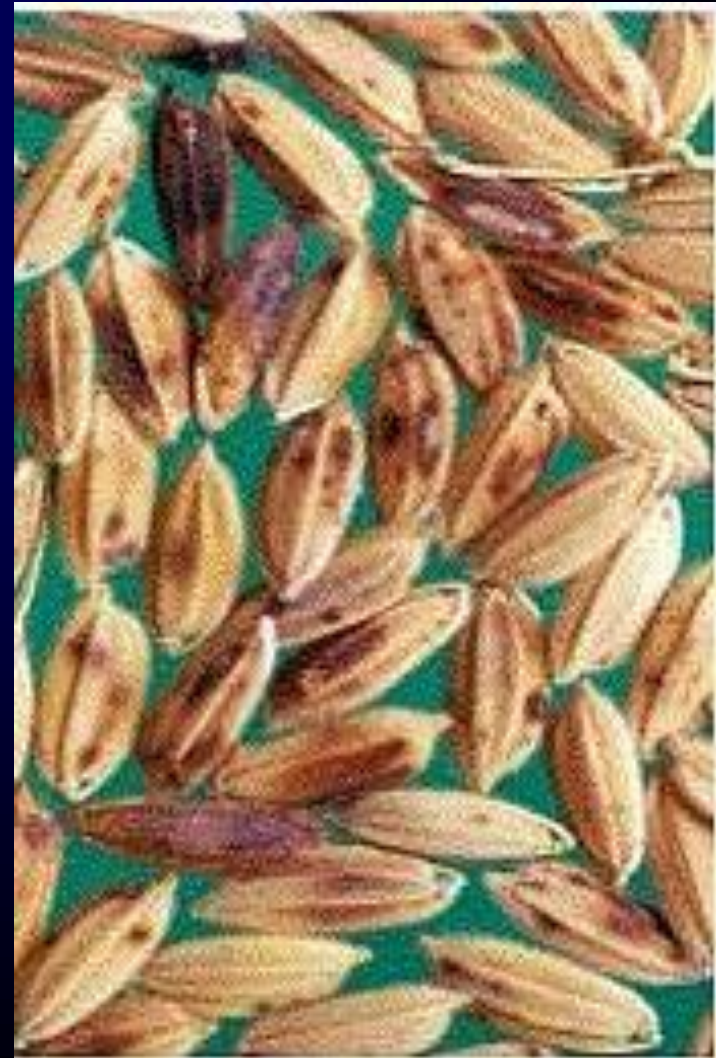
Brown Spot - *Bipolaris oryzae*

Syn: Helminthosporium oryzae

Sexual stage : *Cochliobolus miyabeanus*

Symptoms

- ❁ **Seedling blight**
- ❁ **Numerous small, oval / circular, dark brown or purplish brown dots**
- ❁ **Matured spots are brown with grey / whitish centers**
- ❁ **Infected panicles and grains with brown spots**

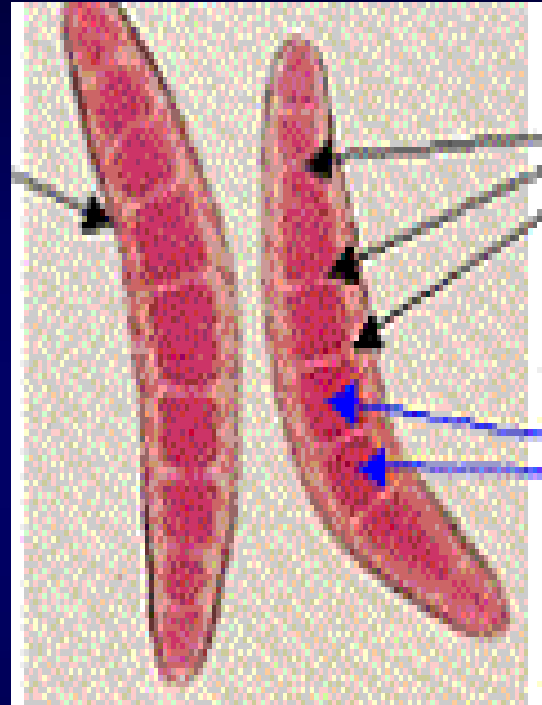
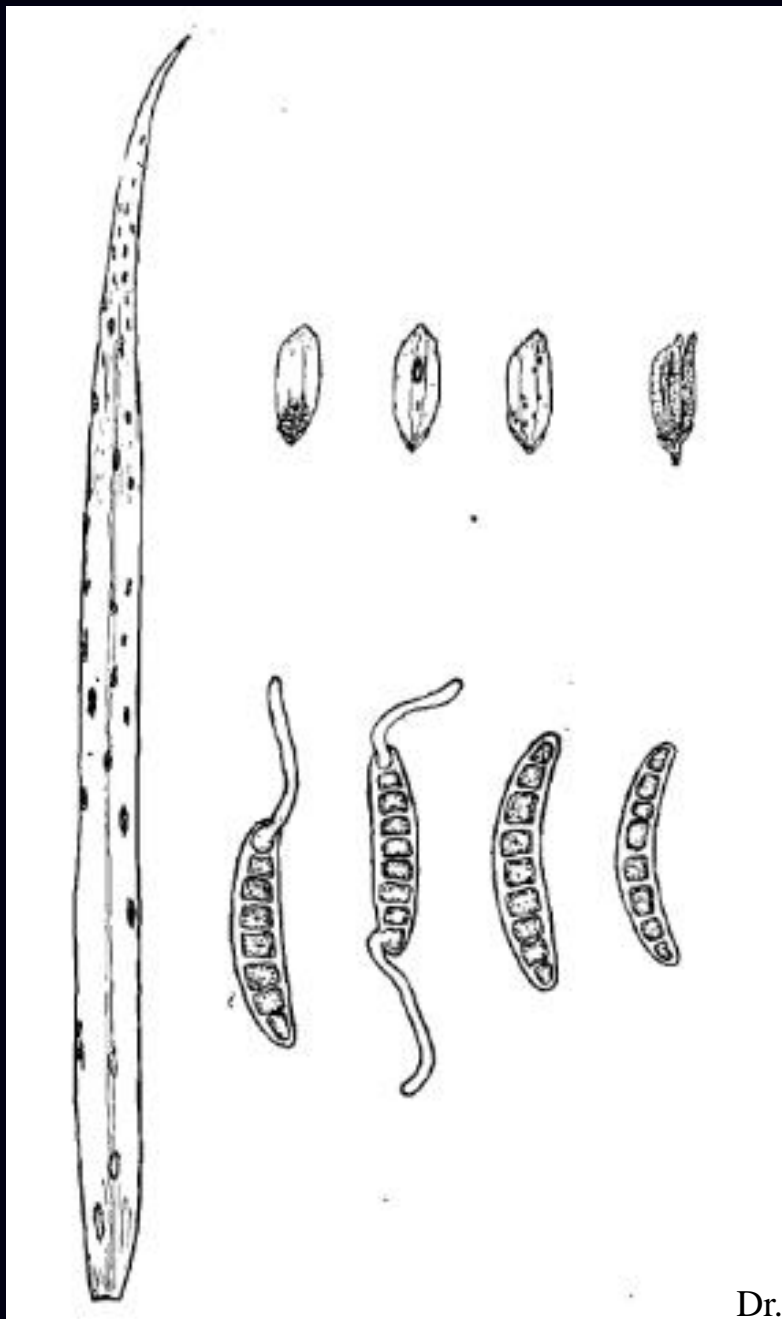




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Favourable conditions

- ❁ **presence of infected seeds, volunteer rice, rice debris, and several weeds**
- ❁ **poorly drained or nutrient deficient soils**
- ❁ **temperature ranging from 25-30°C**
- ❁ **water stress and high humidity**

Management

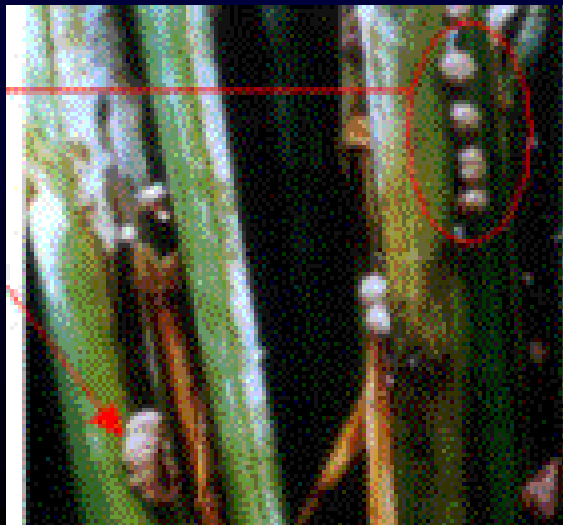
- ❁ **Hot water seed treatment (53-54°C) for 10-12 min**
- ❁ **Seed treatment with Captan or Thiram**
- ❁ **Seed treatment with tricyclazole followed by spraying of mancozeb + tricyclazole at tillering and late booting stages**
- ❁ **Application of edifenphos, iprodione, IBP**

Sheath Blight -*Rhizoctonia solani*

Sexual stage : *Thanetophorus cucumeris*

Symptoms

- ❖ Initial lesions are water-soaked to greenish grey and later becomes greyish white with brown margin
- ❖ Lesions on leaf sheaths near waterline with sclerotia





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Favorable conditions

- ❖ Presence of sclerotia floating on the irrigation water
- ❖ RH- 96 to 100% & Temperature -28-32 °C
- ❖ High levels of nitrogen fertilizer
- ❖ Late tillering growth stages

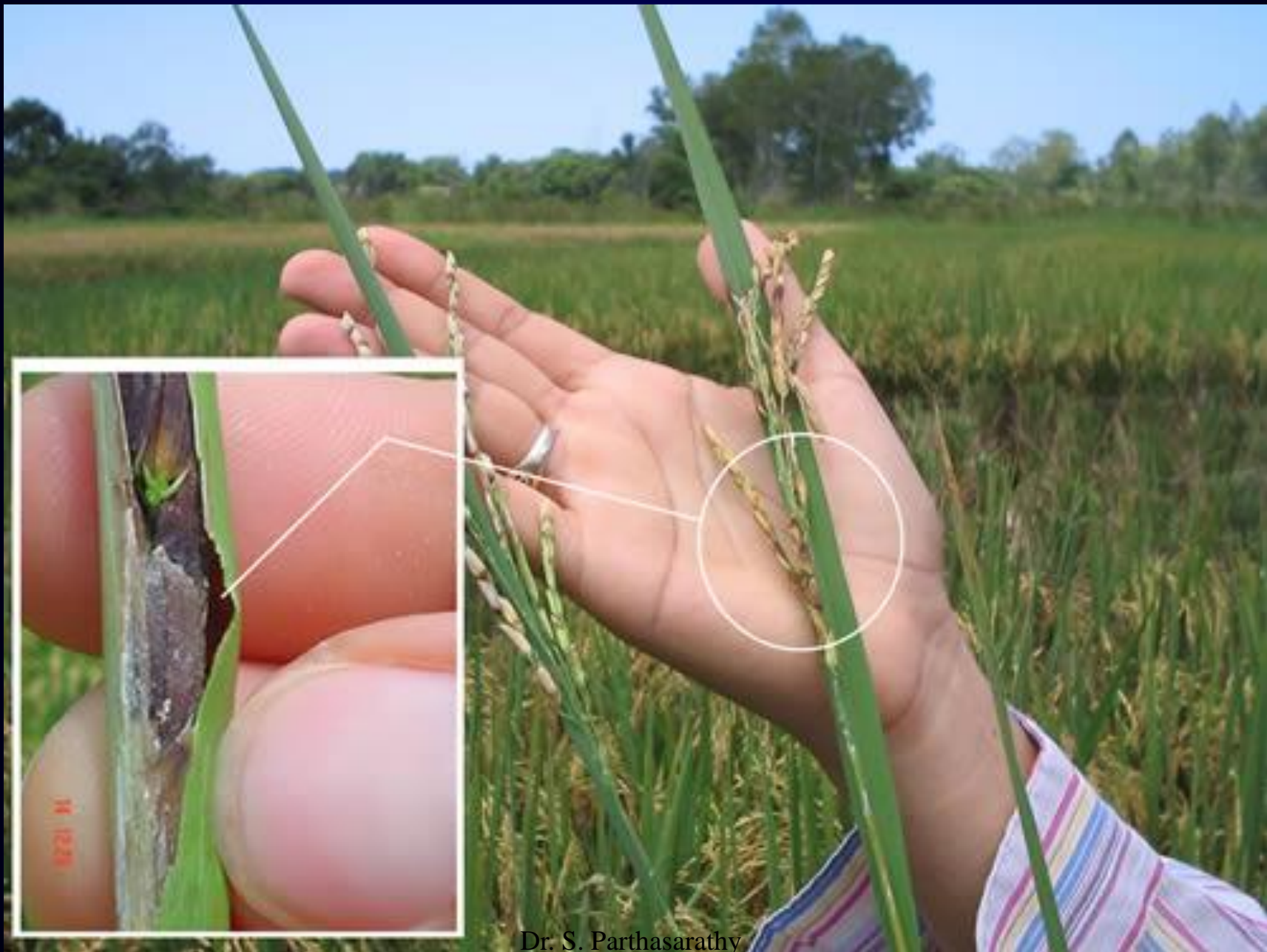
Management

- ❖ **Spraying with Carbendazim (1 g/l), Contaf (2ml/l) , Tilt (1ml/l), Benomyl and Iprodione**
- ❖ **Reduce Nitrogen dosage and Skip Top Dressing**

Sheath Rot - *Sarocladium oryzae*

- Irregular lesions with reddish brown margins and grey center
- Entire or parts of young panicles to remain within the sheath
- Panicles rot and florets turn red-brown to dark brown
- Whitish powdery growth inside the affected sheaths
- Infected panicles sterile, shrivelled, or with partially filled grain





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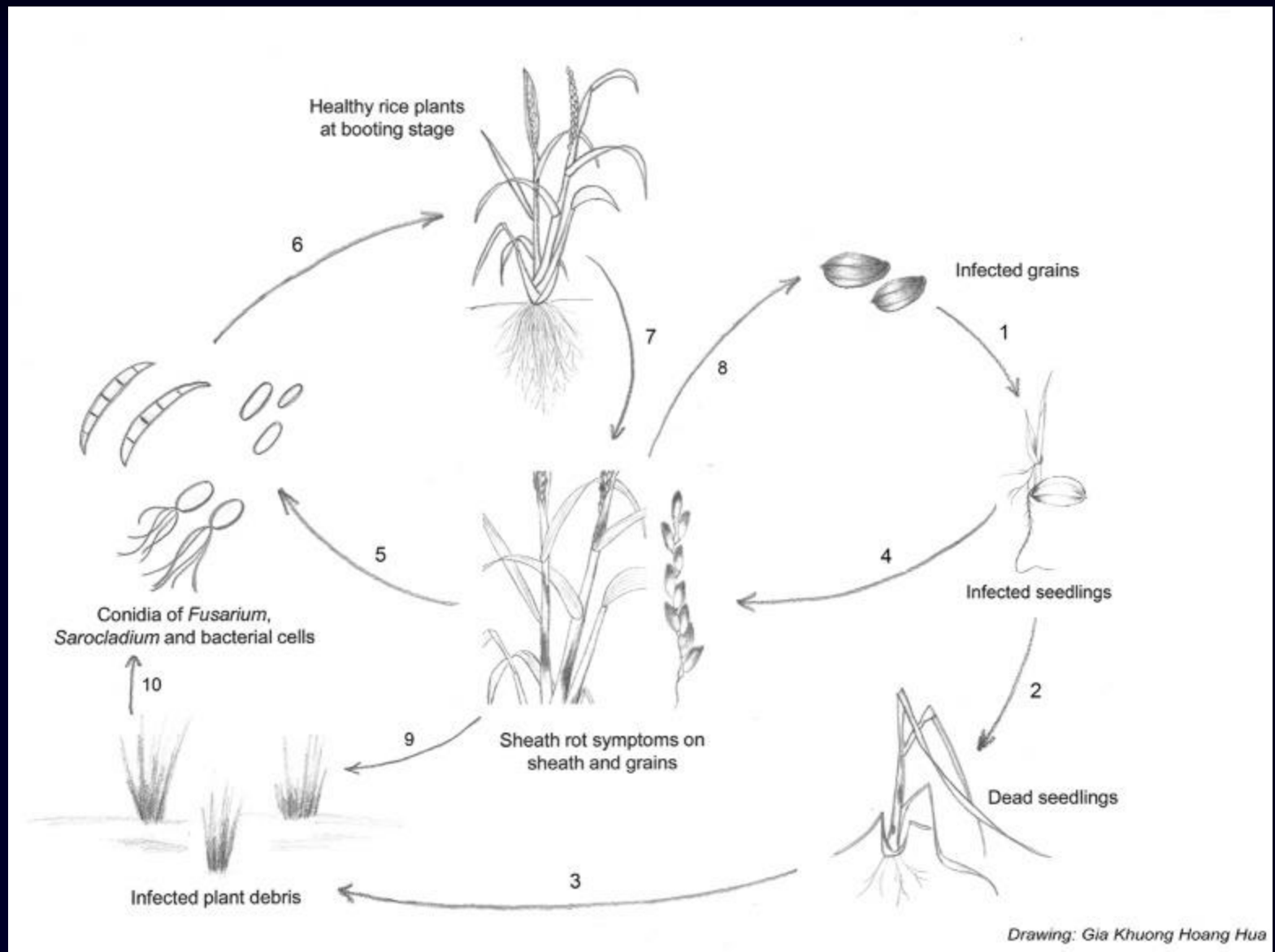






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Disease cycle of sheath rot caused by *S. oryzae*, *Fusarium* sp. or *Pseudomonas fuscovaginae*.

Favorable conditions

- **Associated with insect injury**
- **High amount of nitrogen and seed borne**
- **High relative humidity and dense crop growth**
- **Temperature from 20 to 28°C - heading to maturity rice crop stages**

Management

- **Seed treatment**
- **Removal of infected stubbles and spacing**
- **Application of potash at tillering stage**
- **Spraying with Carbendazim, Edifenphos or Mancozeb**
- **Spraying with Benomyl and Copper oxychloride**

Stem rot - *Sclerotium oryzae*

Symptoms

- Small and irregular black lesions on the outer leaf sheath near water level
- Infected stem rots
- Tiny white to black sclerotia and mycelium inside the infected culms
- Infected culm lodges



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Management

- **Burning of straw and stubbles and draining the field can reduce sclerotia in the field**
- **Balanced fertilizer**
- **Spraying - Thiophanate-methyl and validamycin A**

False Smut- *Ustilaginoidea virens*

Symptoms

- **Rice grain is transformed to a mass of yellow fruiting bodies - velvety spores**
- **Immature spores slightly flattened, smooth, yellow, and covered by a membrane**
- **Mature spores orange and turn yellowish green or greenish black**
- **only few grains in a panicle are usually infected and the rest are normal**

Management

- **Destruction of straw and stubble**
- **Applying captan, captafol, and mancozeb**
- **Spraying of Carbendazim and copper fungicide**



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Foot Rot/ Bakanae disease - *Fusarium moniliforme*

Sexual stage : *Gibberella fujikuroi*

Symptoms

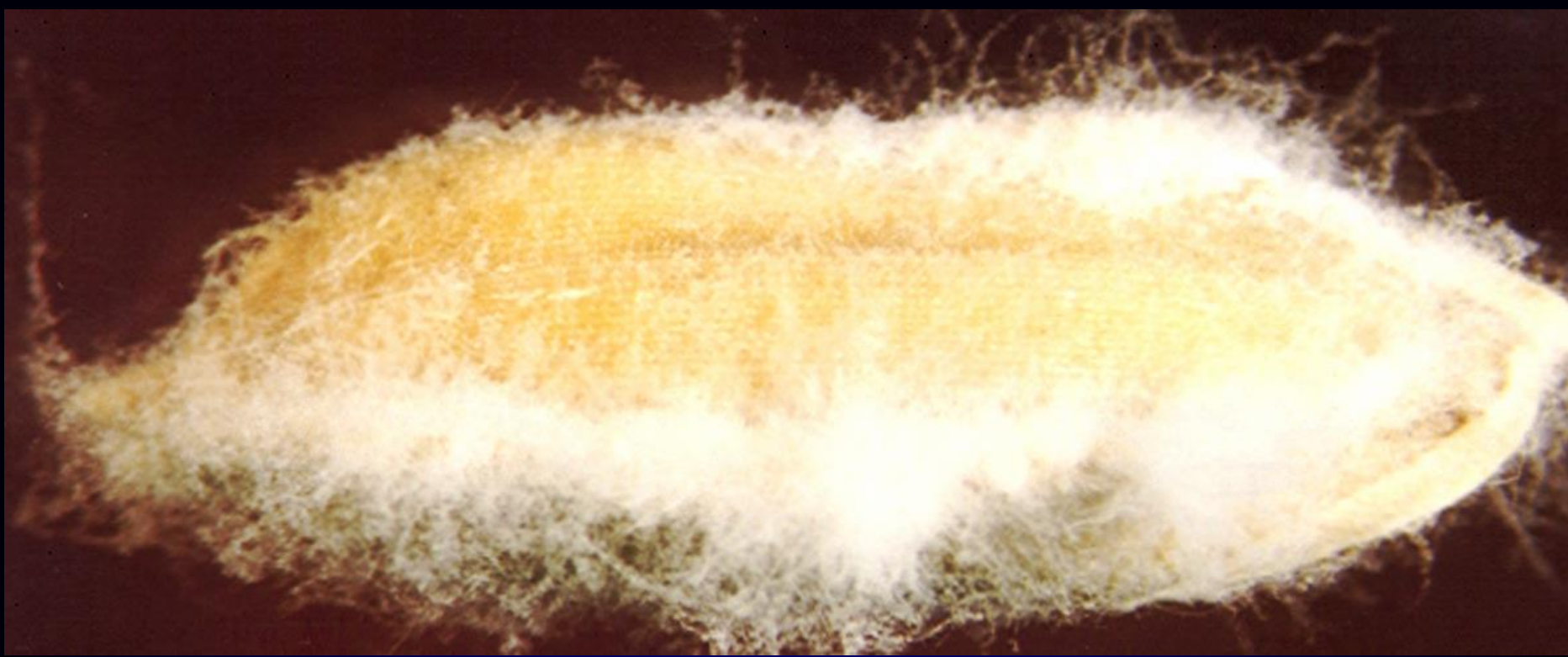
- ❖ Infected plants several inches taller than normal plants in seedbed and field
- ❖ Thin plants with yellowish green leaves and pale green flag leaves
- ❖ Dying seedlings at early tillering
- ❖ Reduced tillering and drying leaves at late infection
- ❖ Partially filled grains, sterile, or empty grains for surviving plant at maturity





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O.P. Sharma, Bugwood.org



Management

- **Salt water can be used to separate lightweight, infected seeds from seed lots and thereby reduce seedborne inoculum.**
- **Seed treatment : Thiram, Carbendazim, or Benomyl.**

Udbatta disease - *Ephelis oryzae*
(Sexual stage: *Balansia oryzae-sativa*)

Symptoms appear at the time of panicle emergence.

The entire ear head is converted into a straight compact cylindrical black spike like structure since the infected panicle is matted together by the fungal mycelium.

The spikelets are cemented to the central rachis and the size is remarkably reduced. The entire spike is covered by greyish stroma with convex pycnidia immersed inside.



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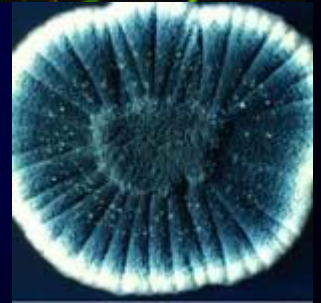


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Collateral hosts:
Grasses, *Isachne, elegans,*
Cynadon dactylon, Pennisetum sp.
and *Eragrostis tenuifolia.*

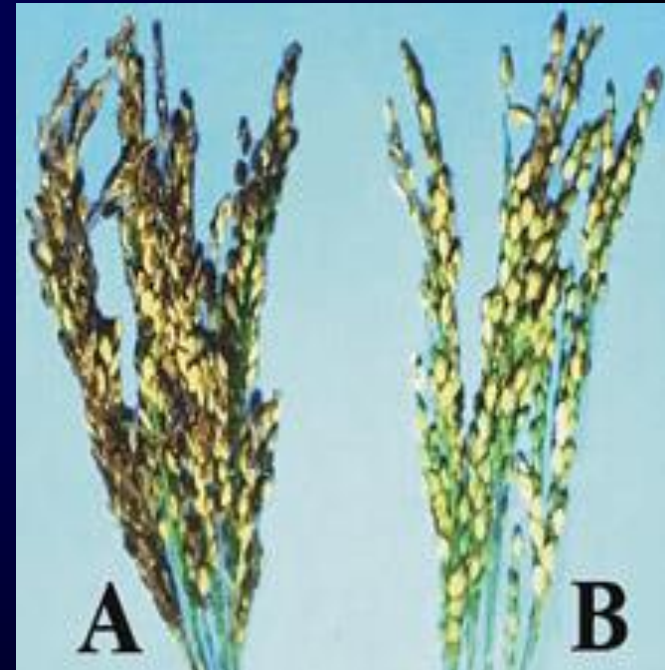
- **Use disease free seeds for sowing.**
- **Hot water treatment of seeds at 52°C for 10 min.**
- **Removal and destruction of diseased panicles in field.**



Grain discolouration – fungal complex

Drechslera oryzae, *Curvularia lunata*, *Sarocladium oryzae*, *Phoma* sp.,
Microdochium sp., *Nigrospora* sp. and *Fusarium* sp.,

- ❖ Grain are infected either after milk stage or after harvest or during storage
- ❖ Infection may be internal or external causing discolouration of the glumes or kernels
- ❖ Dark brown or black spots appear on grains
- ❖ Under humid condition prominent fungal growth



Management

Spraying the crop with Carbendazim 250g/ha or Iprobenphos 500 ml/ha or Captatol 250g/ha or Mancozeb 1 kg /ha at boot leaf stage and 10 days later controls grain discolouration.

Narrow spot - *Cercospora janseana*

Symptoms

- ❖ Short, narrow, elliptical to linear brown lesions usually on leaf blades but may also occur on leaf sheaths, pedicels, and glumes or rice hulls

Management

- ❖ Spraying of fungicides such as benomyl, propiconazole, carbendazim and iprodione





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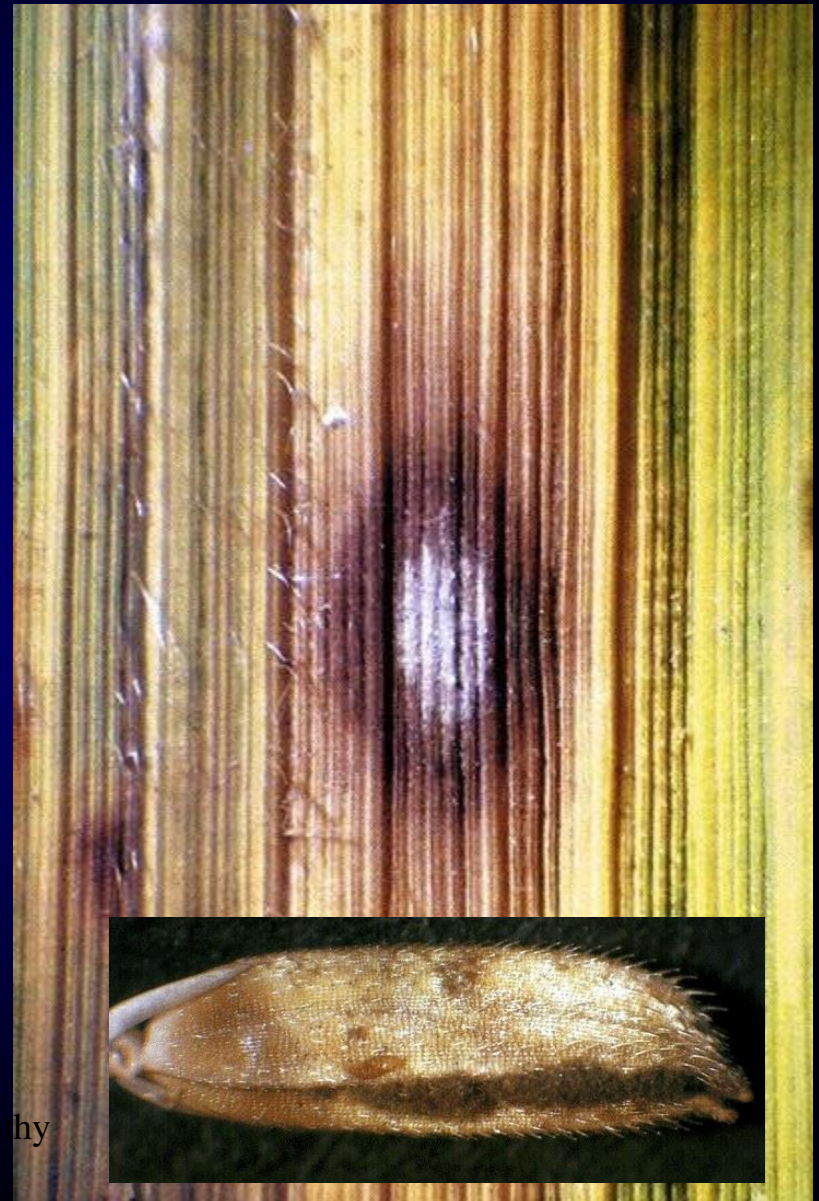
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Stackburn disease - *Trichoconiella padwickii*

Symptoms

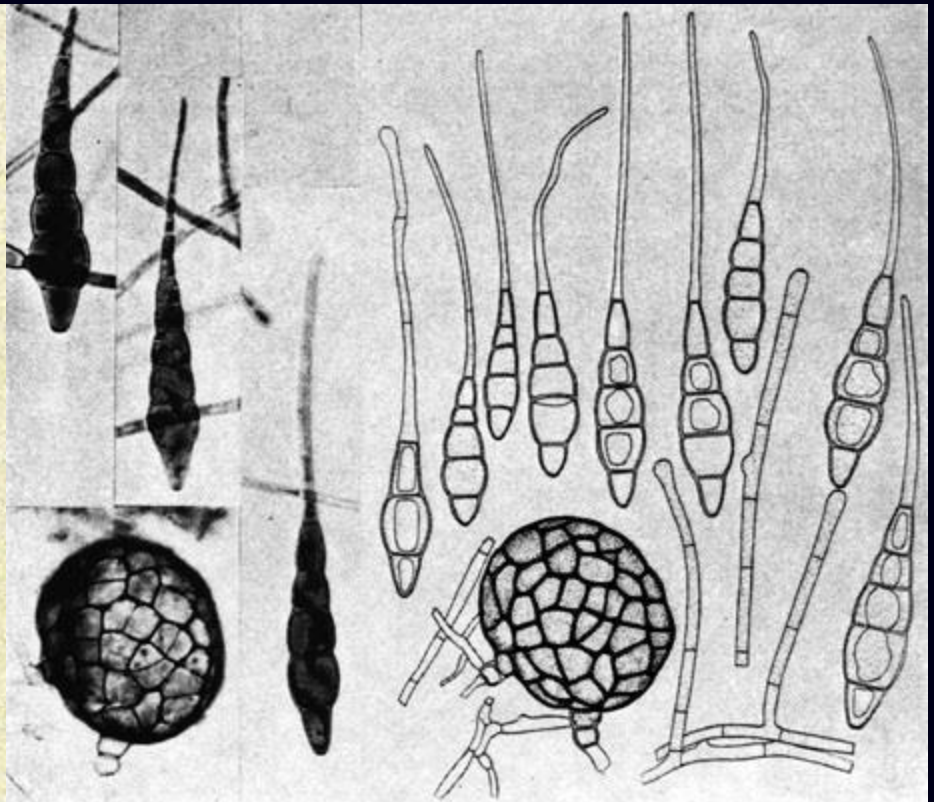
Lesions are oval to circular spots, 3-10 mm in diameter. Young lesions are tan, later becoming grey to white with a narrow, dark-brown border.

T. padwickii invades the kernel, developing brown-black spots or blotches. Shrivelled, discoloured and brittle grain results from such infection.





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Seedborne infections

Soaking seed for 15 minutes in water at 54°C gave the best results for germination and disinfection.

Bacterial Blight - *Xanthomonas oryzae* pv.

oryzae

- ❖ Seedling wilt or kresek
- ❖ Water-soaked to yellowish stripes on leaf blades or starting at leaf tips then later increase in length and width with a wavy margin
- ❖ Appearance of bacterial ooze that looks like a milky or opaque dewdrop on young lesions early in the morning
- ❖ Lesions turn yellow to white as the disease advances
- ❖ Green water-soaked layer along the cut portion or leaf tip of leaves as early symptom



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Favourable conditions

- ❖ **Presence of weeds**
- ❖ **Presence of bacteria in the rice paddy and irrigation canals**
- ❖ **Warm temperature, high humidity, rain and deep water**
- ❖ **Over fertilization**
- ❖ **Handling of seedlings at transplanting**

Management

- ❖ Treat the seeds by soaking it for 12hrs in streptomycine (0.15%) followed by hot water treatment at 52°C-54°C for 30 min
- ❖ Spray Streptomycin sulphate + Tetracycline combination 300 g + Copper oxychloride 1250 g/ha
- ❖ Grow resistant varieties such as IR-20, IR-54, Pusa2-21, Ajay, Asha

Leaf streak - *Xanthomonas oryzae* pv.

oryzicola

- ❖ Initially, small, dark-green and water-soaked streaks on interveins from tillering to booting stage

Management

proper application of fertilizers, planting spacing, the use of resistant varieties, and hot water treated seeds.





Tungro - Rice tungro virus

vector-*Nephotettix virescens*

- ◆ Stunting and reduced tillering
- ◆ Leaves become yellow or orange-yellow
- ◆ Delayed flowering, - panicles small and not completely exerted
- ◆ most panicles sterile or partially filled grains





Grassy stunt virus vector-BPH- *Nilaparvata lugens*

- ✓ Stunting
- ✓ Excessive tillering
- ✓ Erect growth
- ✓ Bronzed appearance



- **Diseased hills are severely stunted with excessive tillering and a very upright growth habit**
- **Diseased hills has a grassy and rosette appearance**
- **Leaves short, narrow, and yellowish green with numerous small rusty spots or patches, which form blotches**
- **Retention of green coloration of the leaves after application of sufficient nitrogenous fertilizers**
- **Infected plants usually survive until maturity, but produce no panicles**
- **The symptom develops 10-20 days after infection.**



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Rice ragged stunt virus

BPH- *Nilaparvata lugens*

Symptoms

Infected plants severely stunted during early growth stages

Leaves short and dark green with serrated edges

Leaf blades twisted at the apex or base, which result in the spiral shape of the leaves

Leaf edges uneven and the twisting give the leaves a ragged appearance

Ragged portions of the leaves are yellow to yellow-brown

Vein swellings develop on the leaf blades and sheaths

Swellings pale yellow or white to dark brown

Flag leaves twisted, malformed, and shortened at booting stage

Flowering is delayed

Incomplete panicle emergence

Partially exerted panicles and unfilled grains



**Phosphamidon 40 SL 1000 ml/ha (or)
Phosalone 35 EC 1500 ml/ha (or) Carbaryl 10 D 25 kg/ha (or)
(or) Acephate 75 SP 625 gm/ha (or)
Chlorpyrifos 20 EC 1250 ml/ha.**

Rice yellow dwarf -Phytoplasma

- Stunting and yellowing
- Excessive tillering
- Usually sterile
- Survive in weeds
- GLH – vector
- Resistant varieties :IR 62 and 64





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arthasarathy



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**Rice dwarf virus,
Rice black-streaked dwarf virus,
Rice grassy stunt virus,
Rice ragged stunt virus, and
Rice transitory yellowing virus**

