



**FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES**

**DISEASES OF FIELD CROPS PPA - 301**

## LECTURE 01

*Pyricularia oryzae* (Syn: *P. grisea*) (Sexual stage: *Magnaporthe grisea*)

### Symptoms

The fungus attacks the crop at all stages of crop growth. Symptoms appear on leaves, nodes, rachis, and glumes. On the leaves, the lesions appear as small bluish green flecks, which enlarge under moist weather to form the characteristic spindle shaped spots with grey centre and dark brown margin (**Leaf blast**).

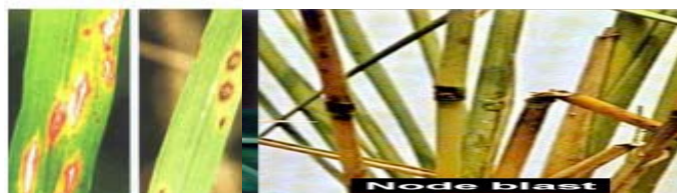
The spots coalesce as the disease progresses and large areas of the leaves dry up and wither. Spots also appear on sheath. Severely infected nursery and field appear as burnt. Black lesions appear on nodes girdling them. The affected nodes may break up and all the plant parts above the infected nodes may die (**nodal blast**).

During flower emergence, the fungus attacks the peduncle and the lesion turns to brownish-black which is referred to as rotten neck / neck rot / panicle blast (**neck blast**).

In early neck infection, grain filling does not occur while in late infection, partial grain filling occurs. Small brown to black spots may also be observed on glumes of the heavily infected panicles. The pathogen causes yield losses ranging from 30-61 per cent depending upon the stages of infection.

### Pathogen

The mycelium is hyaline to olivaceous and septate. Conidia are produced in clusters on long septate, olivaceous conidiophores. Conidia are pyriform to ellipsoid, attached at the broader base by a hilum. Conidia are hyaline to pale olive green, usually 3 celled. The perfect state of the



### Leaf blast

#### Favourable Conditions

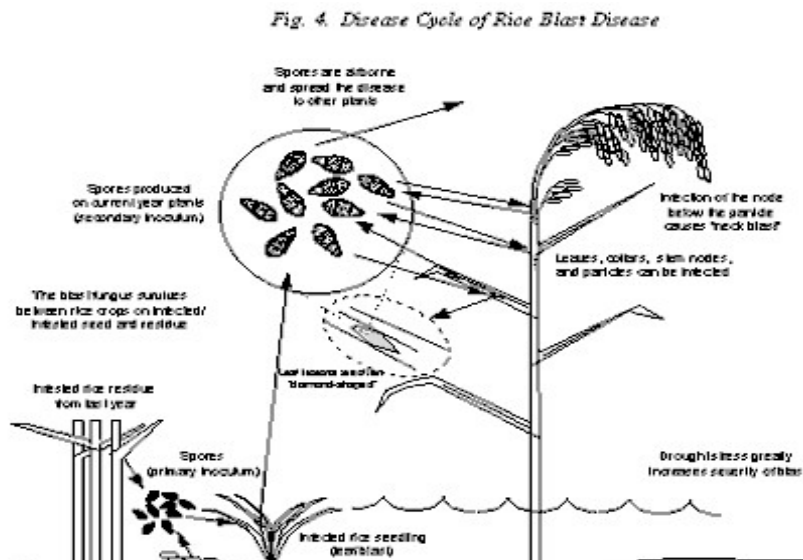
- Intermittent drizzles, cloudy weather, more of rainy days, longer duration of dew high relative humidity (93-99 per cent).
- Low night temperature (between 15-20°C or less than 26°C).
- Availability of collateral hosts and excess dose of nitrogen.

Forecast for rice blast can be made on the basis of minimum night temperature range of 20-26°C in association with a high relative humidity of 90 per cent and above lasting for a period of a week or more during any of the three susceptible phases of crop growth, viz., seedling stage, post transplanting tillering stage and neck emergence stage. In Japan, the first leaf

blast forecasting model was developed named as BLAST. Later several other models have also been developed namely, [PYRICULARIA](#), [PYRIVIEW](#), [BLASTAM](#), [EPIBLA](#) and [PBLAST](#).

### Disease Cycle

The disease spreads primarily through airborne conidia since spores of the fungus present throughout the year. Mycelium and conidia in the infected straw and seeds are major sources of inoculum. Irrigation water may carry the conidia to different fields. The fungus also survives on *collateral hosts viz., Panicum repens, Digitaria marginata, Brachiaria mutica, Leersia hexandra* and *Echinochloa crusgalli*.



The [conidia](#) present on infected grain and mycelium in the infected tissue are viable for 2 to 3 years. Airborne conidia infect the plants both in nursery and in main field.

The fungus also survives on collateral hosts like *Leersia hexandra* and *Echinochloa colonum*. The brown spot fungus is normally present in areas with a long history of rice culture. Airborne spores that are capable of causing infection are produced in infested debris and older lesions.

### Management

- Field sanitation-removal of [collateral hosts](#) and infected debris from the field.
- Use of slow release nitrogenous fertilizers is advisable.
- Grow tolerant varieties *viz., Co44* and *Bhavani*.
- Use disease free seeds.
- Treat the seeds with [Thiram](#) or [Captan](#) at 4 g/kg. Spray the nursery with [Edifenphos](#) 40 ml or [Mancozeb](#) 80 g for 20 cent nursery.
- Spray the crop in the main field with [Edifenphos](#) 500 ml or [Mancozeb](#) 2 kg/ha when grade reaches 3. If needed repeat after 15 days.