

Diseases of Wheat and Their Management

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Triticum sp. also known as wheat is an annual grass plant belonging to family Poaceae. It is referred as 'King of cereals' because of first ranking in area and production in the world. In India, wheat is second most leading crop in area and production after rice. It is native to South West Asia. Wheat is grown as a rabi crop in northern zone of India and grown twice a year in Southern zone. Wheat plant is a C₃, long day plant which require cool and moist weather during vegetative growth period and warm dry weather during grain formation. Its inflorescence is called as spike or ear which consists of main axis (rachis) on which 15-18 spikelets are grouped in a zig-zag manner. Wheat grain is caryopsis which is oval in shape. There are three classes of wheat grown in India: *Triticum aestivum* (Bread wheat), *T. durum* (Macroni Wheat) and *T. diccicum* (Emmer Wheat).

Importance of Wheat

Wheat is consumed worldwide as a staple crop. Because of its importance in human nutrition and bread-making, it is called as staff of life. Bread wheat covers 87% of wheat area and consumed widely as 'chapati' in India. Other than this Durum wheat is good for making pasta, sweets, porridge etc. Wheat consists of 75% carbohydrates, 10-13% protein, 10% fiber and 2.5% fats. Gluten protein found in wheat (rich in thiamine and niacin) is responsible necessary in baking. Wheat grain is high in potassium and also consists of iron, zinc, magnesium, Vitamin E and B-group vitamins. Wheat grains are milled into flour which is used in making noodles, pastries, breads, semolina (for making pasta) and other bakery products.

Every year, almost 20% losses of wheat yield is due to disease damage in crop. Depending on intensity of disease attack, it might even leads to crop failure. The major crop disease of wheat are: Rusts (*Puccinia sp.*), Loose Smut (*Ustilago nuda tritici*), Karnal Bunt (*Neovossia indica*), Powdery Mildew (*Erysiphe graminis tritici*) and Alternaria Blight (*Alternaria triticina*).

Diseases of Wheat

Rust: Three types of rusts are found in wheat

1. Black Rust
2. Brown Rust
3. Yellow Rust

1. Black Rust : Caused By *Puccinia graminis*

Symptoms:

- Present on all aerial parts after 7-15 days of infection.
- Known as 'Killer disease' of wheat because it might cause crop failure in severe cases.



- Oval to spindle brick red pustules appear which break out from epidermis of host tissue.
- Appearance of large number of pustules may cause stem weakening and lodging.

2. Brown Rust : Caused by *P. recondite*

Symptoms:

- Small oval uredial pustules (bright brown) appear as blisters which after rupturing become dusty.
- In severe cases – leaves dries and die.
- Mainly found on leaf blades and sheaths of plant.



3. Yellow Rust (Stripe Rust): Caused by *P. striiformis*

Symptoms:

- In early stages, yellowish uredial pustules are formed in linear arrangement.
- In severe attack, uredia appear also on leaf sheath, glumes and awns.
- Dull black telia appear at maturity.



Management:

- Use balanced application of N fertilizer.
- Avoid late sowing.
- Use resistant varieties such as HD 3226, DBW 187, HD2967 and avoid planting PBW343 and HD2851.
- Spraying 2 or 3 times with Zineb @0.2% or Mancozeb @0.25% at 15-20 days interval.

Loose Smut: Caused by *Ustilago nuda tritici*

Symptoms:

- Appears from emergence of panicle and boot leaf stage.
- Infected head emerges earlier than healthy.
- Black powder appears instead of wheat grains which is a mass of olive-green spores covered by silvery membranes.
- After rupture, spores disperse and infect other healthy spikelets.



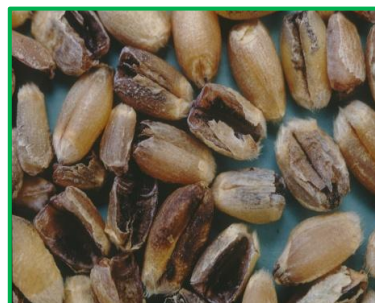
Management:

- Eradicating diseased plant and burning it.
- Seed treatment with Bavistin @ 0.2% or Vitavax @0.2%
- Using Hot water treatment by soaking seed in water at 52 degree Celsius for 10 minutes.

Karnal Bunt: Caused by *Neovossia indica*

Symptoms:

- Only few grains are affected in spikelets which are converted into black sooty powder.
- Foul, fishy smell from rotten black powder due to trimethylamine.



Management

- Use crop rotation.
- Avoid excessive irrigation during flowering of wheat.
- Seed treatment with CuCO_3 or Thiram @3g /kg seed.
- One spray of propiconazole @0.1% at ear head emergence can be effective.
- Avoid using varieties such as HD2009 and HD2329.

Powdery Mildew: Caused by *Erysiphe graminis tritici*

Symptoms:

- White powdery growth of fungus appears on upper leaf surface.
- Initial pustules are on lower leaves, which in severe cases spread to leaf sheath, stem and earheads.

Management:

- Avoid higher N application.
- Crop rotation.
- Foliar spray of Sulfex @0.2 % at 10-15 days interval.



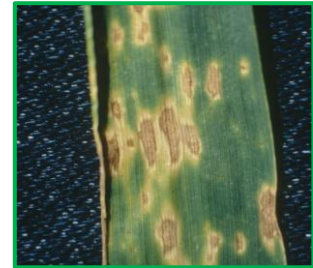
Alternaria Blight: Caused by *Alternaria triticina*

Symptom:

- Irregular shaped brown to grayish color spot spread from lower to upper leaves.
- These spots coalesce causing drying of leaves.
- In severe cases, it gives a burnt appearance.

Management:

- Spraying of Mancozeb and Zineb @2 kg/ha.
- Avoid excessive use of fertilizer.

**References**

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