

**IMPORTANT RUSTS**

1. *Puccinia. graminis* Black rust of wheat
2. *Puccinia. striiformis* var. *tritici* Yellow or stripe rust of wheat
3. *Puccinia. triticina* Brown or leaf rust of wheat

1. Yellow rust appears rarely on leaf sheath and very rarely on stem. The pustules are produced in lines, yellow in the beginning; turn to black colour later on.
2. Leaf rust also appears rarely on leaf sheath and very rarely on stem. The pustules irregularly arranged on leaves. Colour brown of orange turning to black later on.
3. Stem rust appears on stem, rarely on leaf sheath and very rarely on leaves. The pustules brick red turning to black on maturity.

**STEM RUST OF WHEAT**

**Causal organism:** *Puccinia graminis*

**Order:** Uredinales

**Family:** Pucciniaceae

The stem rust of wheat is a classical plant disease. *Puccinia graminis* ranks as the most destructive plant pathogen. It has been estimated to cause as much as 10 % losses annually to wheat crops the entire world over. Various strains of the pathogen attack oats, rye, barley and a number of grasses. The principal alternate host is the barberry *Barberis vulgaris*.

In Pakistan this rust does not generally appear before March when the temperature is 75-85°F. By this time the crop is fairly advanced in growth and therefore, the chance of doing serious damage to the crop is reduced.

**Symptoms:**

1. The characteristic symptoms produced on wheat is the appearance of long, narrow streaks (pustules) that occur on the stems, leaf sheaths and leaves.
2. The pustules first appear as dark red are called Uredia, producing Uredospores. As the crop approaches maturity the pustules become black and are now known as telia because they now produce the teleutospores.

**On barberry:**

1. Small yellowish to pinkish spots develop on the leaves.



2. Small dark bodies spermatia or pycnia appear on the spots on the upper surface of the leaf and white, cup shaped structures the aecia soon develop on the lower surface.

**Dissemination:** Basidiospores, aeciospores and uredospores are dispersed primarily by wind. The basidiospores and aeciospores are spread over a radius of one to two miles. The uredospores, however, are carried over long distances. Viable uredospores have been trapped at altitudes exceeding 10,000 ft. Teleutospores remain attached to the wheat straw by stalk cells. Spermatia are carried from one spermatium to another by insects.

**Over Wintering:** The teleutospores on straw persist through the winter in cold countries. But in warmer countries the fungus remains active through the winter as mycelium producing uredospores on the winter-sown wheat.

**Epidemiology:** Uredospores can germinate at temperatures between 5 °C to 25°C. The optimum temperature is between 18°C to 20°C. A film of water must be present on the surface of the leaf to allow germination and penetration. The following factors favor epidemics:

1. Large areas sown with susceptible wheat varieties.
2. Prevalence of physiologic races capable of attacking the wheat varieties.
3. Strong winds to carry uredospore over long distances and
4. Mild, humid weather.

**Control:**

- 1- Development of resistant varieties is the only hope.
- 2- Eradication of alternate host: Eradication of barberry will not altogether eliminate the disease. But there is one great, advantage in it, that is, the pathogen will not be able to produce new physiologic races because the hybridization stage will get eliminated.