Yellow Ear Rot or Tundu Disease of Wheat

The disease was first described by Hutchinson (1917) from Punjab in India. Milne (1919) observed the disease incidence depended on mechanical injury to the plant parts by eelworms and that the bacterium could grow only on the excretion of the eelworms.

The disease has subsequently been reported from Egypt, China, Australia, Cyprus, Asiatic, USSR, Israel, Syria, Pakistan, New Zealand, Brazil, USA, Canada and several European countries.

Experiments have shown that the nematodes, Anguina tritici, responsible for transforming the developing grains in wheat ears to galls (popularly called 'gegle' and 'mamni') or ear cockle disease is associated with the bacterium in causing the rot.

Symptoms -

1. The 'tundu' disease is characterized by twisting of the stem, distortion of the earhead and rooting of the spikelets with a profuse oozing liquid from the affected tissues. Hence, the name of the disease is yellow ear rot. The ooze contains masses of bacterial cells.

2. The nematode alone cause wrinkling, twisting and various other distortions of the leaves and stem and also forms small round galls on the leaves.

3. The infected plants are shorter and thicker than the healthy plants. In the distorted earheads, dark galls are found in place of kernels.

4. When the bacterium is associated with the nematode, the disease symptoms are intensified at the flowering stage and the yellow ear rots set in. Due to the combined action of the nematode and bacterium, the earhead become chaffy and the kernels are replaced by dark nematode galls which are also contaminated with the bacterium.

5. The infected plants produce more tillers than do the healthy one.
Causal Organism -

*Clavibacter tritici* (Carlon and Vidaver) Davis *et al.* is the causal organism.

The pathogen was earlier named as *Corynebacterium tritici*. The bacterium is rod-shaped, 2.3 x 1 μm in size. It is motile by a single polar flagellum. It is Gram positive.

It may be mentioned that the disease occurs due to the combined action of the wheat nematodes *Anguina tritici* and the bacterium *Clavibacter tritici*.

Disease Cycle -

The disease starts from seeds contaminated with the nematode galls. When such contaminated seeds are sown in the field they absorb moisture from the soil. The larvae escape from the galls and shortly climb up the young wheat plants. The nematodes have a tendency to seek the tender growing points of the plants where they remain as ectoparasites.

After the plants flower, the nematodes enter the floral parts and form galls in the ovaries. While within the galls, sexual differentiation occurs, copulation takes place and the female lay eggs, up to 2000 in number. The eggs hatch into larvae under favourable conditions and become active parasites.

Once the nematodes is inside the tissues of the ovary, the bacterium becomes active and cause rotting. The yellow ooze coming out of the rotting earhead provides the inoculum for the secondary spread of the diseased which is favoured by wind and rain.

The nematodes probably functions as a vector, transporting the bacterium to the otherwise inaccessible meristematic regions of the host. The nematodes secretes some substances in the presence of which the bacterium can cause the disease.

Disease Management -

1. The sowing of gall-free seeds in non-infected soil will help to reduce the incidence of disease.

2. The seeds can be freed from the galls by being floated in brine, at 160 g of sodium chloride per litre of water.
3. Wheat, barley, oat or other susceptible crops should not be sown in infected soil.

4. Solar heat during May and June in the northern wheat belt of our country can be utilized for destroying the galls and nematodes.

5. Infected plant should be carefully taken out and brunt. Seed for sowing purpose should be taken from disease free areas only.