

Tundu disease of Wheat

By:

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Introduction

Tundu disease is often known by names like “yellow ear rot of wheat”, “tundu disease of wheat”, “bacterial rot of wheat ears”, “bacterial spike blight”, and “yellow slime disease”. This disease was first reported by Hutchinson (1917) from Punjab in India and is now known to occur infection by bacteria occurs only when they are in association with nematodes, *Anguina tritici*, in the soil. That is why this disease is often associated with “ear crockle disease” of wheat caused by *A. tritici*, the nematode.

It has been presumed that the association with nematodes is essential for infection by the bacteria as the nematodes mechanically transmit the bacteria. Contrary to it, the nematodes can cause ear crockle disease by their own, the bacteria need not be associated with them.

Symptoms of Tundu Disease:

- The early symptoms of tundu disease are wrinkling of lower and twisting of the middle leaves generally evident when the crop is reaching maturity.
- This is followed by curling and twisting of spikes.
- A bright yellow sticky slime exudes mainly from the ear and envelops it.
- In addition, the slime trickles down to glumes, stem, and leaf sheaths and envelop them.
- The slimy substance becomes deeper yellow, hard, and dry in dry weather resulting in retardation of plant growth and distortion of stem and ear.

The Causal Organism

Corynebacterium tritici (Hutchinson)Burkholder.Syn.*Pseudomonas tritici* Hutchinson

- The bacterium is rod-shaped, motile with one polar flagellum, Gram- positive, and measures 2-3 x 1.0 micron
- . Colonies developed on agar media are bright yellow primarily then turning to orange, round, convex, with entire margin, moist, glistening, opaque in centre, and opalescent at edges.The margin of the colonies is entire.

Tundu Disease Cycle:

(i) Perennation:

1. Since both ‘ear crockle’ and ‘tundu disease’ occur on wheat frequently in association, the bacteria are carried along with the galls developed due to ear crockle disease caused by the nematode.

2. Such galls get mixed with the seed lot and the pathogen perennates therein.
3. In addition, the nematode galls containing bacteria may survive in soil for 20 years or more. It has been studied that the bacteria can survive inside the nematode galls for a fairly long time, probably for at least 5 years.

(ii) Primary Infection:

- When seeds contaminated with bacteria and nematode galls are sown in the field, the galls absorb moisture from the soil and release out the nematode larvae and bacteria.
- If galls are already perpetuating in soil, they also release nematode larvae and bacteria in the same manner.
- The nematode larvae shortly start climbing up on the young wheat plants carrying bacteria with them.
- After the plants flower, the nematodes enter the floral parts wherein the bacteria establish primary infection causing tundu disease.
- Simultaneously, the nematodes may cause “ear cockle” disease and the two diseases may appear in association on wheat plants.

(iii) Secondary Infection:

- Chances of secondary infection during the same growing season are least as the disease appears when the crop is reaching maturity.
- If most favourable conditions prevail in the field for a considerable time period, the bacteria produced in primary infection and released with yellow slimy ooze can cause secondary infections on healthy plants.

Predisposing Factors:

Wind and rain are most favourable factors for disease incidence.

Control of Tundu Disease:

- a. As soon as the symptoms appear, the infected plants should be uprooted and burnt.
- b. Sowing of wheat seeds from nematode galls is an essential measure for control of this disease. Seeds can be made gall-free by soaking them in strong solution of common salt (solution called 'brine') prepared at the rate of 40 lb. salt dissolved in 25 gallons of water. The galls float on the surface of the solution and are removed. This method is the most effective one and recommended strongly.
- c. In tropical countries, summer ploughing helps destroy bacteria and nematodes occurring in soil by heat and desiccation and thus reduces disease incidence in the next season.