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Loose Smut of Wheat and Its Management

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INTRODUCTION

Wheat (*Triticum aestivum* L) is the most extensively grown cereal crop in the world, have been domesticated more than 10,000 years ago. Together, the three major global staple cereals-wheat, rice, and maize-combine to form a major component of the human diet, accounting for nearly half of the world's food calories and two-fifths of protein intake. Wheat alone plays a particularly crucial role in ensuring global food and nutrition security, supplying a fifth of global food calories and protein.

Wheat production is challenged by a wide range of Pathogens. Among the different diseases of wheat *viz*., Loose smut, Rust, Karnal bunt, Flag smut, Hill bunt or Stinking smut of wheat is major limiting factor in its production and productivity.

Pathogen:

The *Loose smut of wheat* is internally seed-borne disease *caused by fungus Ustilago segetum* var. *tritici* is a basidiomyceteous fungus that affects wheat. *Loose smut of wheat* is a common disease of wheat throughout the world.

The percentage of smutted heads determines the reduction in wheat yields, as the majority of infected heads do not yield any seed. Based on the environmental factors during flowering, the amount of loose smut fluctuates from year to year. An infection is most likely to occur in cool, humid weather with light showers or heavy dews. Wheat harvested from a field where only 1% of the heads were infected can contain seed that has at least 10% loose smut infection when the weather is favourable. Individual field losses due to loose smut were as much as 40% in 1961.

- Disease type- Systemic
- Group of smut spore called- Sorus
- Less tillering
- Respiration- increase
- Dry weight of Plant
- Pathogen survive in embryo as secondary mycelium
- Temperature- 23ºC
- Relative Humidity- 60-85%

Systematic Position of Loose Smut of wheat:

Kingdom-	**-**	**Mycota**
Division	-	Eumycota
Sub-Division	-	Basidiomycotina
Class	-	Teliomycetes
Order	-	Ustilagniales
Family	-	Ustilagniaceae
Genus	-	*Ustilago*
Species	-	*Segetum*
Fungal	-	*Species Tritici*

Symptoms:

- The pathogen is internally seed-borne.
- The growth of the plant and its appearance are not affected.
- The disease is easily recognized at the time of heading by the characteristic dusty black appearance of diseased heads.
- Disease ears emerge from the boot leaf a little earlier than healthy ears, and their blossoms are replaced by a black, powdery mass of spores.
- This sooty mass is composed almost entirely of millions of microscopic smut spores (teliospores).
- During the flowering stage of typical heads, the spores are rapidly dispersed by the wind, leaving just an upright, bare rachis during harvest.
- In many varieties, partially smutted ears or only few tillers show smutted ears while others are free from the disease.

Figure 1. Loose smut of wheat

Management:

1. Use clean/ Healthy seeds for sowing.
2. Use of resistant varieties such as Kalyan, DWR-59, Np-120, and Pb-90**).**
3. Burry the infected ear heads in the soil, so that secondary spread is avoided.
4. Hot water treatment:
    - Seed dip in cold water- 4hrs-64-85ºf
    - Seed dip in hot water-52ºc for 10 minutes.
    - Drying of seed
5. Solar treatment by Luthra, 1953
6. wheat Seed dip in hot water--52ºc for 10 minutes.
7. Apply only systemic fungicide for seed treatment. Contact fungicides are not effective against loose smut of wheat.
8. Seed Treatment with Vitavax power @ 2.5g/kg seed before sowing.

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