

## Loose Smut

### Symptoms

Loose smut is a fungal disease in which full heads are replaced by smut spores (teliospores) (Fig. 1). Conspicuous loose smut symptoms are evident at early heading.



Fig 1. Smutted heads, where all the structures except the rachis are replaced by spores. Photo: CIMMYT.

Smutted heads, in which grain and glume structures are replaced by masses of black teliospores covered by a gray membrane, emerge several days earlier than contrasting green healthy heads. The fragile membrane

that covers the spores breaks off soon after heading and the spores become airborne or are washed off by rain, eventually leaving only the empty rachis as evidence of the disease (Fig. 2). Yield lost in the infected heads is total. Diseased heads produce not grain at all.



Fig 2. Rain and wind disperse loose smut spores exposing the bare rachis. Photo: CIMMYT.

### Causal Agent

A fungus named *Ustilago tritici* is the causal agent of loose smut of wheat. The pathogen can

be detected microscopically on infected seed by embryo staining.

Loose smut affects wheat, rye and triticale.

## Inoculum Source and conditions

Loose smut is a seedborne disease. The fungus is carried systemically in the infected seed.

When infected seed is sown the seed germinates and the fungus grows systemically within the seedling colonizing meristematic tissue. The mycelia reach maturity when spikes develop, producing smutted heads.

At flowering, airborne teliospores from the smutted heads are spread by wind to healthy plants. Under mild temperatures and humid conditions, spores landing on florets will germinate. The spore's germ tube penetrates the ovary, developing a mycelium in the embryo. The mycelium remains dormant in the asymptomatic seed until the seed germinates.

## Control

Planting high-quality pathogen-free seed will eliminate the inoculum source.

Applying systemic fungicide (Carboxin, triadimenol) to all wheat seed will help reduce disease levels.

Using resistant cultivars helps reduce final symptoms.

Placing seed production fields away from commercial fields helps avoid infection of the seed from air-borne spores, which can be carried long distances by winds.

## References

1. Compendium of Wheat Diseases. 2nd Ed. 1987. M. V. Wiese. APS Press. The American Phytopathological Society.

2. Wheat diseases Atlas. McCoy N. L. and R. W. Berry. Texas Agricultural Extension Service. Texas A&M University System.

3. Wheat Diseases and Pests: a guide for field identification. J. M. Prescott, P. A. Burnett, E. E. Saari, J. Ranson, J. Bowman, W. de Milliano, R. P. Singh, G. Bekele. International Maize and Wheat Improvement Center.

## Links

<http://www.uky.edu/Ag/IPM/scoutinfo/wheat/disease/diagnost.htm>

<http://wheat.pw.usda.gov/ggpages/wheatpests.html>

<http://wheatdoctor.cimmyt.org>

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