Extension Plant Pathology
Loose Smut of Wheat

April 2013

Loose smut of wheat diagnosed in wheat fields in New Mexico - Have you seen dark black seed heads on your wheat? If so, your plants may be infected with the fungus, *Ustilago tritici*. The disease is commonly referred to as loose smut of wheat. This disease has been known for centuries and is easy to recognize in the field – at heading, blackened seed heads are easily visible among newly emerged, healthy green heads. Loose smut occurs worldwide. It reduces yield in proportion to the percentage of smutted heads. Although yield losses are usually less than 1%, losses closer to30% can occur under conditions that are especially favorable for disease development. In contrast to other wheat seed diseases, loose smut has little to no effect on grain quality for food or feed.

Symptoms – The disease appears at heading when dark brown to black, "smutted," seed heads appear among newly emerged, healthy, green heads. The seed in these diseased heads are converted into a mass of dry, dark brown to black spores (teliospores) (Fig. 1). The disease is called loose smut because the spores produced on smutted heads are easily removed by wind and rain. Typically, after a short while, only the bare, sooty, flower stocks remain. In some cases, the seed head is only partially infected. Prior to heading, diseased plants may have dark green leaves with chlorotic streaks, but this symptom generally goes unnoticed. Seed with no visible symptoms can be infected with the fungus.

Disease Cycle – The fungus survives as dormant mycelium in symptomless seed. When infected seed germinates, the fungus systemically infects the plant. Seed produced on infected plants are converted to fruiting bodies containing copious

Figure 1. Loose smut on wheat (Photo: Mark Uchanski, NMSU).

Figure 2. Seed in this infected head have been converted to fruiting bodies containing dark brown spores (Photo: Taylor Gobble, NMSU-PDC).

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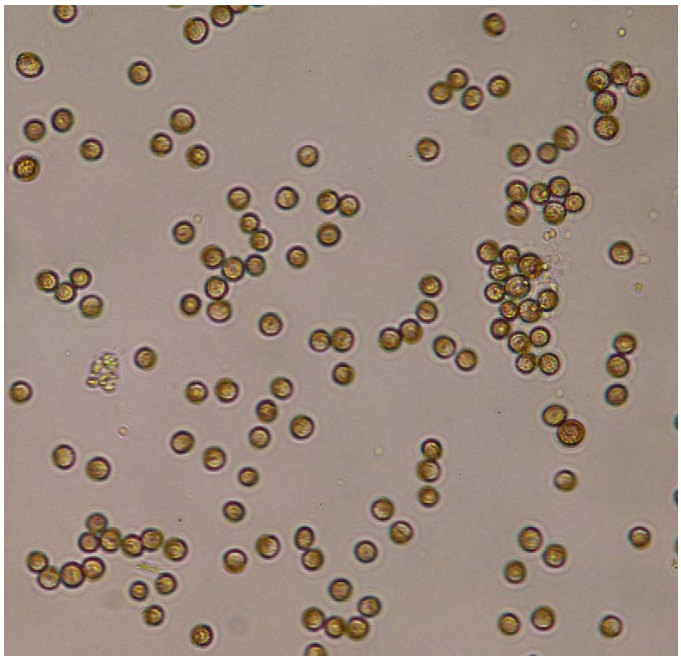

Figure 3. Teliospores of *Ustilago tritici* (Photo: Jason French, NMSU-PDC).

amounts of spores (Fig. 2). Wind, rain and insects disseminate the spores (Fig. 3) to neighboring plants. Plants are susceptible to infection only for one week during flowering. Open flowers become infected when spores germinate and penetrate the ovary wall. Seed that develops from infected ovaries appear normal but harbor the pathogen. These infected seed are fully germinable and serve as primary inoculum for new disease outbreaks if used for planting.

Conditions for Disease – Infection occurs only during flowering and is favored by humid conditions with cool to moderate temperatures (60 – 72 °F). These conditions coupled with light showers or heavy dews are particularly favorable for disease development.

Management – The disease is primarily managed by the use of resistant cultivars and pathogen-free seed. Although many cultivars exist with resistance to some races of the fungus, no cultivars are resistant to all races. Therefore, cultivar resistance alone isn't sufficient to manage the disease. Pathogen-free seed can be obtained through hot water or heat treatments or through certified disease-free seed programs. Seed production fields must be inspected at heading to ensure the absence of loose smut. Systemic fungicides can also be used as a seed treatment to help control the disease in germinating seedlings. No treatments are available to protect flowers from wind-blown or rain-splashed spores.

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