COMMON BUNT OF WHEAT

Dept. of Plant Pathology
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A significant outbreak of common bunt occurred in north central and central Kansas in 2006. The area most affected was generally within an area bounded by Washington, Beloit, McPherson and Great Bend. While it is not known exactly how many acres were affected, there was some wheat rejected at the elevators due to bunt contamination.

Common bunt causes losses by reducing yield and by imparting a foul, fishy odor to the grain. Grain with bunt is usually unfit for milling. Dockage for smutty grain is based on the number of "smut balls" or smutty kernels in a 250 g (about l/2 lb) sample of grain. The amount docked for smutty grain may differ among elevators.

An alternate use for smutty grain is to feed it. Smut infected wheat may be fed to all classes of livestock, including poultry, without ill effects. Breathing high concentrations of smut spores may be hazardous especially to humans suffering from asthma. The bunt fungus does not produce chemicals toxic to animals.

Figure 1. Common bunt infected kernels.

Figure 2. Bunt balls and healthy grains.

Symptoms

Common bunt is not easily identified until the grain filling period is nearly complete. Infected plants generally produce fewer and smaller heads than normal plants. Heads of diseased plants generally are darker green and retain their green color longer than healthy heads. The diseased heads have a more open appearance due to the expanding of the smutted kernels that causes a spreading of the glumes or chaff (Fig. 1). When the grain is in the "dough" stage, the presence of smut can be detected by pinching the grains between the thumb and forefinger. Smutted kernels will be filled with a soft, black, pasty mass of smut spores. In mature grain the pasty interior of smutted kernels will have changed to an oily, black powder. Diseased kernels (bunt balls) are a dull gray-brown color, short and plump(Fig. 2). A strong, fishy odor is also associated with infected heads, although related diseases such as Karnal bunt can also produce a similar odor.

Common bunt differs from loose smut in that only the kernel tissues within the seed coat are replaced by smut spores, rather than the whole head. Bunted plants are weaker than healthy plants, and are often susceptible to seedling blights and winter injury.

Disease Cycle

In Kansas, common bunt is normally a seed-borne disease, although it can survive in the soil during excessively dry summers. Wheat seed becomes contaminated with bunt spores when a diseased field is harvested. The combine breaks open the bunt balls, releasing the smut spores that adhere to the surfaces of healthy kernels. In fields that are heavily infected, a black cloud of spores may

envelope the combine. The dust clouds can quickly clog air filters and may become a fire hazard.

When the contaminated seed is planted in the fall, the smut spores germinate at the same time the wheat seed germinates. The fungus invades the coleoptile of the developing seedling prior to emergence. The fungus then invades deeper into the young tissues and establishes itself in the tissues that eventually develop into the head. The fungus inhabits the developing kernels as the plant grows and displaces the tissues within the kernels, eventually converting into spores by the time the plant is mature. When the field is combined, the disease cycle is repeated.

Management

1. All currently grown wheat varieties are susceptible to common bunt.

2. The most common source of infection is the saving of infested seed from the previous crop. The more years away from seed certification, the greater the problem is likely to be in a seedlot.

3. The most effective and economic means of controlling of bunt is through the use of seed treatment fungicides. If all growers treated their seed each year with the proper fungicide, bunt could be eliminated as a disease problem in Kansas. It is highly recommended that all non-certified seed be treated to control bunt and seedling blight diseases. Some fungicides that control bunt do not necessarily control seedling blights and those that control seedling blights may not control bunt. The best seed treatments therefore, are combinations of fungicides that are active against bunt and seedling blight diseases. It is best to have the seed treated commercially using modern seed treatment equipment or to buy certified seed that has been treated by the seed processor. If this is not possible, several formulations are available that can be used on the farm in the drill box of the planter. Thorough coverage of the seed is essential, especially when treating seed in the drill box. For more information on seed treatments and recommendations to control seed-borne diseases of wheat consult the K-State Wheat Seed Treatments fact sheet at http://www.plantpath.ksu.edu/DesktopDefault.aspx?tabid=536.

4. Planting wheat early when soil temperatures are above 60 F may allow the germinating seedling to outgrow the fungus and escape infection. Planting before the Hessian fly free date for an area is discouraged however, because of the increased risk not only of fly damage, but also because of increased risk of virus infection, especially from wheat streak mosaic virus and barley yellow dwarf virus.