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PLANT PATHOLOGY & MICROBIOLOGY

PLPA-

Common and Dwarf Bunt

Symptoms

Common bunt and dwarf bunt are not easily identified until the time wheat is in heading stage. Infected plants generally produce fewer and smaller heads and may be slightly stunted due to common bunt, or severely stunted and with numerous tillers in the case of dwarf bunt. At flowering, infected heads look more slender than healthy heads and appear dull with a blueish-grey cast, remaining green longer (Fig. 1).

Fig. 1. Common bunt infected head (bottom) has a duller cast and an open appearance. Photo: CIMMYT.

At maturity, infected heads stand erect because of their light weight, and look plumper and open compared to normal heads. Kernel tissues within the seed coat are replaced by a mass of black spores (bunt balls, Fig. 2) that turn oily and acquire a foul odor. Bunt balls become visible after the soft dough stage and begin to break open, revealing the black powdery spores (teliospores). Bunt balls of common bunt are about the same size and shape as the kernels they replace; those of dwarf bunt are nearly spherical.

Fig. 2. Kernels are replaced by a mass of bunt teliospores. Photo: CIMMYT.

Many smut balls are shattered during threshing, and spores are spread to healthy grain and soil. Presence of a foul fishy odor in fields and grain shipments is indicative of heavy bunt contamination. Smut balls may be removed by cleaning, but spores will still be carried on kernels.
Losses result from yield reduction and grain contamination. Depending on the contamination level, if not rejected, smutty grain will be subjected to dockage. Smutty grain is considered unfit for milling due to its odor but can be used as livestock feed. Airborne spores are allergenic and combustible.

Causal Agent

Two species of fungi, *Tilletia tritici* (syn. *T. caries*) and *T. laevis* (syn. *T. foetida*), are the

causal agents of common bunt; a third species, *T. controversa* causes dwarf bunt.
Tilletia caries is the more widely spread of the species and can be differentiated by its reticulated teliospores; *T. foetida* has smooth teliospores.
Wheat, rye, triticale, and many grasses are affected by these diseases.

Inoculum Source and conditions

Spores survive by lying dormant in the soil (soilborne) or on the seed (seedborne). Spores germinate at the same time seeds germinate, when the weather is cool and the soil is moist. After several developmental processes the pathogen penetrates the seedling coleoptile before seedling emergence and progresses undetected invading the meristemic tissues. The disease develops systemically and it is at heading that the fungus replaces all kernel tissues within the pericarp and spores form. Spores are dispersed to the grains and soil at harvest.
The disease is more common and severe in wheat sown in the fall. Common bunt occurs worldwide but is limited to temperate climates; dwarf bunt spores germinate only at low temperatures under snow cover on unfrozen ground thus dwarf bunt occurs only in areas having prolonged snow cover.

Control

Recommended measures are:
- Use of certified smut-free seed treated with protectant fungicides (PCNB, thiram, maneb, mancozeb, carboxin, carboxin-thiram) helps reduce incidence by avoiding infection from infested soil.
- Planting of resistant cultivars where available.
- Dwarf bunt is under strict international quarantine regulations to prevent its dissemination.

References

1. Bunt of wheat. 1982. Hoffmann, J.A. Plant Disease 66:979-986.
2. Compendium of Wheat Diseases. 2nd Ed. 1987. M. V. Wiese. APS Press. The American Phytopathological Society.
3. Wheat Diseases Atlas. McCoy N. L. and R. W. Berry. Texas Agricultural extension Service. Texas A&M University System.
4. 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://wheat.pw.usda.gov/ggpages/wheatpests.html

http://wheatdoctor.cimmyt.org

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