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Dwarf bunt of winter wheat

Lester E. Dickens^{1/}

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Quick Facts

- Dwarf bunt is a fungus, *Tilletia controversa*, that affects winter wheat.
- Wheat kernels are replaced by black smut balls.
- Wheat plants affected by dwarf bunt usually are dwarfed.
- The spores of dwarf bunt fungus remain viable in the soil.
- An effective seed treatment is available to control dwarf bunt fungus.

Dwarf bunt is a fungus, *Tilletia controversa*, that affects winter wheat. It occurs in LaPlata, Moffat, Montezuma, Rio Blanco and Routt counties; it is not found in eastern Colorado.

Research on dwarf bunt was begun about 1948 when it was discovered that the fungus was biologically different from common bunts. Many wheat varieties have been tested for resistance or susceptibility to the fungus; most varieties are highly susceptible to dwarf bunt. Consequently there is a limited choice of wheat varieties for a dwarf bunt area.

Samples of dwarf bunt have been tested on a series of differential varieties. The results showed a broad spectrum of virulence, indicating a composite of pathogenic races.

Seed treatments have been evaluated for many years without success until about 10 years ago when Mertect LSP was still an experimental compound. Now this fungicide is properly registered for dwarf bunt.

Symptoms and Signs

Dwarf bunt causes wheat plants to be dwarfed (*symptom*) and to produce smutted grain. The degree of dwarfing is variable. Some infected tillers may reach near normal height, while other diseased tillers are only a few inches tall and hardly free from the boot. In some cases smut can be detected in the rudimentary head.

In dwarf bunt the normal wheat kernels are replaced by black, nearly round smut balls (*sign*). (Common smut forms smut balls that are more nearly the size and shape of healthy kernels.)

At harvest time, smut balls are crushed by the combine, and millions of spores are released as a dust and thereby contaminate the harvested grain. Many of these spores also settle on the soil where they are capable of surviving in a viable condition for a number of years. The extremely dwarfed plants are left in the field and thereby add to the inoculum already present.

Life Cycle

The sources of inoculum are soil-borne spores and seed that is contaminated with spores. The fungus invades the plant and remains undetected in the tillers; later the smut balls become evident as plants near maturity.

Weather conditions may contribute to the incidence of the diseases, especially wet conditions after fall planting and persistent snow cover during the winter.

Control

An effective seed treatment, Mertect LSP fungicide (Merck & Co.), has been developed for control of dwarf bunt. It was through the efforts of Colorado that registration was obtained under the state 24(c) provision for special local needs. Other western states also have registered this material.

Mertect LSP fungicide is distributed by Gustafson, Inc., 6350 LBJ Freeway, Suite 180, Dallas, Tex. 75240.

In CSU tests over the past 10 years, a high degree of control under heavy inoculum conditions has been obtained.

Resistance

An imported wheat germplasm material known simply as P.I. 178383 is one of the very best sources of dwarf bunt resistance currently available to wheat breeders, a recent SEA inheritance study suggests.

The presence of dwarf bunt spores in commercial lots of Western white wheat has severely limited wheat sales to countries that totally ban dwarf bunt, such as the People's Republic of China.

^{1/}Lester E. Dickens, CSU extension professor, plant pathology (7/15/79)

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To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

Dwarf bunt has no effect on humans, but it does reduce wheat quality and yield. By incorporating sources of dwarf bunt resistance into new varieties, wheat breeders hope to restore lost wheat export markets to the Pacific

Northwest.

The inheritance studies were led by SEA geneticist Robert J. Metzger, Cordley Hall, Oregon State University, Corvallis, Ore. 97331, in cooperation with Oregon State University.