

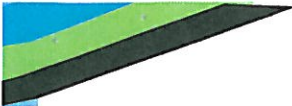
Ergot

The ergot fungus, *Claviceps purpurea*, is endemic to the Great Plains wheat producing region of North America. This disease occurs, to some extent, every year in cereal grains and pasture and roadside grasses in Nebraska. Rye is the principal small grains host. Spores of the ergot fungus infect floral tissues on the head prior to fertilization or within the first few days after fertilization. The closed glumes of self-pollinated grasses, such as wheat, present a physical barrier to infection, resulting in a relatively low incidence of ergot in wheat. However, commercial winter wheat cultivars grown in Nebraska are not immune to infection, and the disease occasionally causes problems with grain quality. Ergot is a potential threat to hybrid wheat production because the open-floreted, male-sterile wheat lines used for hybrid seed production are often susceptible.

Primary infections are caused by spores produced by fruiting structures on germinating sclerotia on the soil surface. Secondary infections originate from spores produced in honeydew exuding from infected florets. These spores are wind blown, rain-splashed, or disseminated by insects to nearby wheat heads. Infected grasses in roadsides, waterways, or fence rows contribute to primary and secondary inoculum, infecting adjacent wheat. Sclerotia from the previous year's infections present on the soil surface germinate in response to moisture by forming stromata (compact masses of specialized vegetative hyphae). Fruiting structures produced on the stromata release infective spores. Following infection of florets, the ovaries enlarge and are converted from base to tip into sclerotia (ergots). If heading of the grasses roughly coincides with that of the wheat, both crops may become infected. More likely, spores in the honeydew



Figure 2. Wheat grain contaminated with ergot sclerotia also known as ergot bodies or ergots (arrows).



of infected grasses are blown into receptive wheat heads at flowering.

Wheat heads are most susceptible just before anthesis (stage in flowering at which anthers rupture and shed pollen). Cool, wet weather that accompanies or prolongs flowering in the grasses and wheat favors infection and honeydew formation.

Not all the sclerotia in harvested wheat may have originated from infected wheat heads. Some may be from infected grasses or rye in the field and mixed in with the wheat, contaminating the grain and causing the wheat to be graded as ergoty. Sclerotia from grasses usually are more slender or flattened in shape than those produced in wheat, whereas those from rye are usually fairly large.

Federal grain standards classify wheat as ergoty if the harvested grain contains more than 0.30 percent sclerotia. These low tolerances are necessary because the sclerotia contain several compounds (alkaloids) that are toxic to humans and animals. Because ergotism in livestock is a real threat, it is best if livestock producers adopt a zero tolerance for sclerotia in either hay or grain feed. Suspect hay or grain can be assayed for alkaloids by the University of Nebraska–Lincoln Veterinary Diagnostic Center. Mail samples or packages to:

Veterinary Diagnostic Center
P. O. Box 832646
Fair Street and East Campus Loop
University of Nebraska–Lincoln
Lincoln, NE 68583-2646

Symptoms

- Initial symptoms are the presence of thick, amber-colored droplets called “honeydew” exuding from infected florets and adhering to the head.
- Purple-black hornlike sclerotia (ergots) protrude from the glumes of mature heads.
- Intact or broken sclerotia contaminate harvested grain (*Figure 2*).
- Sclerotia may be similar in size and shape to a wheat kernel, or they may be more irregularly shaped and larger than the kernel.

Management

- Use sclerotia-free seed.
- Mow grasses in headlands, roadsides, and waterways before they head.
- Survival rate of sclerotia on the soil surface is about one year; therefore, crop rotations or longer (14 month) fallow periods reduce the risk of carryover infections from sclerotia within the field.
- Grain cleaning removes most but not all sclerotia.
- Removal of sclerotia by flotation in brine (20 percent salt solution) is useful for small, high-value seed lots. The sclerotia float and the grain sinks in the brine solution.