

Common Smut Appearing in Corn Fields across the State

– If you have noticed swollen, blackish-blue, kernels on your corn ears, you are not alone. Over the last few weeks, common smut has been appearing in corn fields across New Mexico. Common smut, caused by the fungus *Ustilago maydis*, is a common plant disease associated with developing ears of corn. While the appearance of the disease can be quite alarming, the disease usually affects only a few ears and is generally more of a curiosity than a real concern.

Common smut, also known as blister smut or boil, is found worldwide wherever corn is grown. Although the incidence and severity of the disease varies greatly between fields, in New Mexico the overall loss associated with the disease is typically very low. In Mexico, after proper preparation, the infected kernels are desired as an edible delicacy, but in the U.S. it is considered an undesirable occurrence.

Symptoms: While all above ground plant parts can be infected by the fungus, it is most noticeable on developing ears. The fungus invades the developing kernels causing them to grow abnormally large. These enlarged kernels, called galls, are initially greenish white to silvery white in color (Fig. 1). As the galls age, the interior of the kernel is replaced with fungal spores and the galls darken and turn bluish-black in color (Fig. 2). Eventually, the galls break open to expose the black powdery spores (Fig. 3).



Figure 1. Corn kernel infected with common smut, *Ustilago maydis* (photo: Sandra Key Barraza, New Mexico State University).



Figure 2. Bluish-black discoloration of galls caused by common smut, *Ustilago maydis* (Photo: Florida Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, Bugwood.org)



Figure 3. Smut spores from galls caused by common smut, *Ustilago maydis* (Photo: Howard F. Schwartz, Colorado State University, Bugwood.org).

Leaf and stem infections are likely occurring along with ear infections, but are not ignored as the ear infections are much more noticeable and dramatic. Leaf and stem infections occur mostly on young actively growing tissue. These tissues develop galls which are similar in appearance to galls produced on ears (Fig. 4).



Figure 4. Leaf infections caused by common smut, *Ustilago maydis* (Photo: D. G. White, APSnet.org)

Conditions for Disease: There is no consensus among researchers on the environmental conditions required for common smut. In most locations, rainy, humid weather seems to trigger infection, but it is not uncommon to see common smut in dry locations without significant rainfall or humidity. The optimum temperature range for infection is 79°F to 93°F. Conditions that result in poor pollination may increase the number of ear galls. Plants which are damaged by hail, blowing sand, equipment, chemical sprays, etc. are more susceptible to infection than uninjured plants.

Additionally, a higher incidence of disease is often associated with excessively vigorous crops with high nitrogen fertilization. In contrast, phosphate fertilization tends to decrease the incidence of disease.

The fungus overwinters as teliospores (dormant spores) in crop debris or on soil. When conditions are favorable, teliospores germinate to produce sporidia (infective spores) which are wind-disseminated to susceptible plant tissue.

Management: In most cases, common smut only infects a few ears in a crop and no treatments are recommended. Commercial growers who experience significant losses year after year should look for resistant cultivars. This is the only management strategy that has proven effective in all situations. Other management strategies that work in some locations or in some years include: crop rotation (4-5 years out of corn), sanitation (plow fields and bury crop debris), seed treatment and modification of fertilization practices to avoid excessive nitrogen.

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