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Feeding Moldy Corn to Swine

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The Problem

Infection of corn by molds, prior to harvest or in storage, reduces its value as a cash crop or as feed for livestock. The swine producer who discovers that the corn which he intended to feed is moldy faces three problems: (1) reduced feed efficiency and slower gains because of a loss of nutrients in the grain, (2) refusal or reduced intake by the hogs to eat the corn because of the severity of the infection or because of the production of substances which makes the grain unpalatable, or (3) reduced performance of the hogs because of the production of compounds by the molds which are detrimental or toxic to the hogs.

The seriousness of the moldy corn problem depends largely on the kind of mold involved, how much of it is present, and what the species and age of the animals being fed. Many thousands of bushels of infected grain are fed each year without causing any obvious clinical problems. However, recent research suggests that at least three specific molds may cause special problems to Indiana swine producers when they feed corn infected with these molds. There is some indication that there may be other molds which are potentially troublesome.

The Three Specific Molds

Aspergillus flavus. This is a yellow mold, fairly common in grain, which primarily affects stored grain and is rarely found in freshly harvested corn. This mold requires seed moistures of 16 per cent or above and fairly high temperatures for growth. Large quantities of a very powerful liver toxin and cancer producer are produced by this mold at about 93°F. and high moisture. This toxin has caused the death of thousands of turkey poults and is toxic but not necessarily lethal to hogs. Thirty parts per billion (sometimes less) of this toxin in grain may cause sickness in animals.

Penicillium molds. These molds are usually blue or green in color and are very commonly found in stored grain but only occasionally in unharvested corn. These molds, as well as others, cause "blue eye" of stored corn. Penicillium molds have not been incriminated in livestock diseases in Indiana, but some species of this mold are known to be toxic to poultry and mice. More research is required to determine their effects on livestock.

Gibberella zeae. This fungus can attack corn both in the field and in stored high moisture corn, and may produce several different substances, any of which may cause problems in swine. The type of compound or substance produced depends on the conditions in which the mold is grown. The three known factors which are produced by the Gib fungus are:

1. The Refusal Factor - This substance is produced by the mold on the corn ears in the field, and it is not produced in storage. Cool and moist weather at silking time favors growth of the mold and the production of this substance. Infection can be identified by the
pink or red coloration of the kernels on the tips of the ears. Do not confuse this condition with a disease called kernel red streak. This latter condition appears as dark red or maroon streaks on individual kernels and is also more severe at the tips of ears. Kernel red streak does not affect consumption and appears harmless. Attempts to disguise the refusal factor with molasses or to destroy it by drying are not successful. Infected ears are sorted by swine and only uninfected portions of the ears, usually the butt ends, will be eaten. If shelled corn contains about 10 per cent or more infected kernels, the corn will be refused.

(2) The Emetic Factor - This substance is also produced by the Gib fungus and only in the developing grain. It is usually associated with the refusal factor. If sufficiently hungry, hogs may consume some infected grain, but they will vomit and refuse to eat any more of the infected grain.

(3) The Estrogenic Factor - This factor causes effects similar to those produced by female sex hormones. In hogs, the teats of gilts and barrows will enlarge, the vulvas of gilts will enlarge and become red, and in very severe cases, the vaginas of gilts and rectums of gilts and barrows will prolapse. The Gib fungus produces the estrogenic factor in stored corn when the moisture is 23 per cent or higher and the temperature between 40° and 70°F, and if the corn is not stored in properly sealed bins. This factor is rarely produced while the corn is growing in the field, but once it is produced and is present in stored grain, it will persist for several years.

Precautions in Feeding Moldy Corn

Moldy corn can usually be salvaged by feeding it to livestock, but several factors must be considered:

(1) The moldier the corn, the greater the chance for problems to occur in the animals eating it.

(2) Younger animals are more susceptible to mold toxins than older ones.

(3) Pregnant females are more susceptible than open females or males.

(4) Hogs may be more sensitive to some types of mold toxins than cattle.

(5) Before feeding large amounts of moldy corn, a small sample should be fed to a few young animals. If they remain healthy, the grain can usually be fed safely. If sickness or signs of estrogenic stimulation occur, a sample of the corn should be chemically analyzed for the presence of toxins; both the Aspergillus flavus toxin and the Gibberella zeae can be detected in very small amounts.

(6) Corn known to contain the refusal, emetic or estrogenic factor may be diluted with good grain in order to reduce the severity of the effects caused by these factors. Refusal may still be a problem, however, even with dilution.

When Not to Feed Moldy Grain

Grain which contains as little as 30 parts per billion of the Aspergillus flavus toxin is harmful to livestock. It is not desirable to attempt to lower the amount of this toxin by dilution with good grain, as the toxin may not be uniformly diluted and the Pure Food and Drug Administration (FDA) may condemn the grain.