Agricultural Extension Service
The University of Tennessee
SP341V

Insects

Sampling Stored Grain for Insects, Molds and Related Problems

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Introduction
The periodic and timely sampling of stored grains can detect existing or potential problems before the occurrence of considerable damage to the grain. Proper sampling of stored grain can reveal increases in moisture, temperature and insect or mold problems in the grain.

It is important to be aware of the potential hazards of sampling inside a grain bin. Suffocation can occur in grain bins, and sampling should be done with caution.

Where to Sample
Grain should be sampled at weekly intervals to detect any moisture, temperature, insect or mold problems. The grain may be sampled less frequently during the winter months. However, if warm periods during the winter months continue for a week or longer, samples should be taken during that time.

Where to Send Samples
Samples of insects can be sent to the county agents or the Plant Pest Diagnostic Center, 5201 Marchant Drive, Nashville, TN 37211-5112. Moldy samples which are suspected of having harmful mycotoxins (aflatoxin) can be sent to:

Agdia, Inc.
30380 County Road 6
Elkhart, IN 46514 USA
Phone: 574-264-2014
Toll Free: 800-62-AGDIA (800-622-4342)
Fax: 574-264-2153

Storage Problems
Outside the bin, signs of storage problems can be easily detected. These problems may include leaking grain, bulging walls, standing water, insects, cracked walls and weeds.

Inside the bin, look for crusting of the upper level of the grain (bridged grain). Also look for moldy grain and insects. Note any large amounts of cracked kernels and insect-damaged kernels. These areas should be sampled because they are most likely to contain insects or molds.

Safety Precautions
Bridged grain may result in a cave-in and subsequent suffocation of the workers. Bridged grain is caused when grain mats together forming a false floor in the upper level of the grain mass. Persons falling through this bridged area are subject to suffocation.

Sampling Devices
The deepcup (torpedo) grain probe is the most commonly used sampler available commercially.

The deepcup grain probe (Illustration 1) consists of a separate brass or plastic cup about 8 to 12 inches long with a connected top which separates upon removal from the grain allowing a specified amount of grain to enter the cup. A separate handle and extension rod connects to the top of the cup, providing up to 12 or more feet of extension.


Illustration 1. Deepcup Grain Probe

How to Sample


Illustration 2. Top view of grain mass surface.

While standing on the grain mass surface, push the probe into the grain mass at a slight angle. The top of the cup will open as the probe is pulled up and out of the grain, allowing grain to fill the cup.

It is best to divide the grain surface into quarters and take at least three probes per quarter section of grain mass. This will provide a good representative sample of the grain for the presence of insects, molds or excessively moist grain.

Sampling Difficulties
Overfilled grain bins are difficult to sample for insects or molds. Sometimes the only access points are through the bin wall, door or roof. Sample in the center of the grain mass as deeply as possible. Reach the bin wall if possible at two to three depths.

Examining the Sample
Place the grain sample in a specially designed weevil sieve (1½ inch diameter holes) if available and shake side to side at least 30 times to loosen any insects which may be in the grain. If a sieve is not available, place samples on a white piece of cloth for examination. Inspect the sample carefully for insects. It may be necessary to use a magnifying glass to see some of the smaller insects.

Equipment Needed for Sampling
- Deep bin compartment probe
- Deepcup probe
- Grain sieve with 1/12- or 3/16-inch round holes
- Sample vials
- Bin inspection forms (from author)
- Temperature probe

Summary

Close monitoring of stored grain is very important in preventing insect damage or moldy grain. After insects are found to infest a bin, the only recourse is expensive and hazardous fumigation procedures. If high levels of aflatoxins are found, it may be necessary to discard the grain. Even low levels of aflatoxin can cause long term problems in livestock and poultry.

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