9-19-2005

Grain quality and grain handling issues in drought areas

Charles R. Hurburgh
Iowa State University, tatry@iastate.edu

Follow this and additional works at: http://lib.dr.iastate.edu/cropnews

Part of the Agricultural Science Commons, Agriculture Commons, Agronomy and Crop Sciences Commons, and the Bioresource and Agricultural Engineering Commons

Recommended Citation

The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit https://crops.extension.iastate.edu/.
Grain quality and grain handling issues in drought areas

Abstract
Soybeans will be small seeded. In some cases, the seeds will be flat or oblong chips rather than developed beans. This situation happened several years ago in a dry year; the term "shrinkled" (shriveled and wrinkled) was coined to describe such soybean seeds. The small seed size relates directly to loss in yield. Areas that received late August rains will have fewer "shrinkled" seeds. Seed beans from drought areas will be small.

Keywords
Agricultural and Biosystems Engineering

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering

This article is available at Iowa State University Digital Repository: http://lib.dr.iastate.edu/cropnews/1420
The continued shortage of rainfall in eastern Iowa has affected both yield and quality for corn and soybeans.

Oil content is likely to be more normal, around 19 percent (on a 13 percent moisture basis). However, oil yields per bushel may be lower from flat and small soybeans because extraction is harder, leaving more residual oil in the soybean meal.

Soybean moisture levels will likely be low at harvest, but stressed grain does not store well. Soybeans above 12 to 13 percent moisture should be dried with aeration.

If bean leaf beetles were prevalent, there may be considerable mottling and brown staining. Discoloration does not affect oil and meal yields, but food-grade soybean users prefer normal-colored beans and have a higher percentage of cleanout from discolored lots. The impact of aphids on soybean color and quality is not known.

Soybean quality
Soybeans will be small seeded. In some cases, the seeds will be flat or oblong chips rather than developed beans. This situation happened several years ago in a dry year; the term “shrinkled” (shriveled and wrinkled) was coined to describe such soybean seeds. The small seed size relates directly to loss in yield. Areas that received late August rains will have fewer “shrinkled” seeds. Seed beans from drought areas will be small.

The 2005 soybeans from dry areas are likely to be lower than average in protein unless late season rains occurred before the plants started to turn color. Because protein is formed at the end of the growing season, conditions that shorten the growing season reduce protein levels. Normal protein content for Iowa soybeans is about 35 percent, and for the United States as a whole, it is about 35.5 percent. Expect one to two percentage points of protein less in areas where the growing season was shortened. Lower protein means more difficulty in producing 48 percent protein soybean meal, more concerns for export buyers, and more mill-feed (hulls) for a processor to market. Food-quality soybeans with contract limits for protein and seed size may be most affected. Much of the dry area typically serves the export market.

Oil yields per bushel may be lower from flat and small soybeans because extraction is harder, leaving more residual oil in the soybean meal.

Soybean moisture levels will likely be low at harvest, but stressed grain does not store well. Soybeans above 12 to 13 percent moisture should be dried with aeration.

If bean leaf beetles were prevalent, there may be considerable mottling and brown staining. Discoloration does not affect oil and meal yields, but food-grade soybean users prefer normal-colored beans and have a higher percentage of cleanout from discolored lots. The impact of aphids on soybean color and quality is not known.

Corn quality
Corn quality is also affected by drought. Protein and other quality traits are determined early in the growing season. Drought reduces kernel fill. Corn protein should be average to above average (8% or better). Test weights will be reduced. If the drought was persistent through the entire season, corn test weights could average 52–54 lb/bu, which is less than the acceptable limits for No. 2 corn.

Test weight is a good indicator of corn storability. Corn that is below 54 lb/bu after drying should not be stored into warm weather and should be dried to less than 14 percent moisture before storage of any duration. Lighter corn also will break more in handling. Corn
normally gains 0.25 lb/bu per percent of moisture removed, but drought-stressed corn normally does not experience as much, if any, test weight gain.

Be selective about what corn is placed in storage versus moved at harvest. Low test weight corn should not be put in temporary storages or outdoor piles. It is also not wise to mix corn of different crop years in the same storage bin; the mix is generally much less stable than each year’s crop stored separately.

Extreme drought creates susceptibility to aflatoxin in corn. Aflatoxin is produced by the fungus *Aspergillus flavus* that invades stress-weakened corn in the field. If nighttime low temperatures in August remain above 75 °F for several days, the fungus is more likely to produce toxin. The earliest harvested, most stressed corn is at the highest risk. It is recommended to spot check 2005 corn in severely dry areas before feeding or marketing. Consult with your veterinarian if you suspect a problem.

Aflatoxin testing by the United States Department of Agriculture is required for all corn exports. Elevators serving river and rail export markets will undoubtedly check corn they receive. Likewise, feed markets serving dairy herds should check because of the potential for pass through into fluid milk. The tolerance for aflatoxin in fluid milk is 0.5 ppb compared to 20 ppb in whole corn. Dry and wet grind ethanol plants must be especially careful because the distillers’ grains and corn gluten feed are often used in dairy rations. Processing in these plants concentrates aflatoxin or any other feed toxin about 4:1 in the feed products after starch is fermented or removed.

If corn is dried uniformly, aflatoxin is not likely to increase in storage; storage conditions of 18 percent moisture and above 60 °F are needed to support the *Aspergillus flavus* in storage, and even then, this fungus is often crowded out by more aggressive storage fungi that do not produce toxins.

The Iowa Grain Quality Initiative Web site has additional information about aflatoxin and aflatoxin testing. See [http://www.extension.iastate.edu/grain/resources/specialtopics/aflatoxin/aflatoxin.htm](http://www.extension.iastate.edu/grain/resources/specialtopics/aflatoxin/aflatoxin.htm).

Charles R. Hurburgh, Jr., is professor-in-charge of the Iowa Grain Quality Initiative Management Team and professor in the Department of Agricultural and Biosystems Engineering at Iowa State University.

---

**Plant Diseases**

**Risk of aflatoxin contamination increases with hot and dry growing conditions**

by Alison Robertson, Department of Plant Pathology

Aspergillus ear rot in corn fields has been reported by Iowa State University Extension field crop specialists in southeast and south central Iowa. The concern with this disease is the production of aflatoxins, which are extremely toxic chemicals produced by two molds *Aspergillus parasiticus* and *Aspergillus flavus*. Aflatoxin accumulation is usually associated with poor storage conditions. However, hot, dry conditions during grain fill increase the risk of *Aspergillus* infection and aflatoxin contamination in the field.

**Disease cycle and aflatoxin formation**

Aspergillus fungi survive in plant residues. Numerous spores are produced in hot, humid conditions and carried by wind throughout the field. Infection occurs through corn silks, when they are yellow-brown and still moist, or in association with insect or bird damage to the developing kernels. High temperatures (80–100 °F) lead to yellow-green powdery growth of *Aspergillus flavus* on a corn rootworm-damaged ear. (Alison Robertson)