

Monitoring condition of corn stored in large hermetically sealed polyethylene bags

Preliminary Report, Jimmy Hays Farm, Calhoun County, TX 2007

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SUMMARY: Increase in grain acreage led to shortages of storage space in onfarm and country elevators for the 2007 season. Several grain producers decided to invest in large plastic bags as an option for grain storage at harvest. The thinking behind the alternative was that harvest could proceed uninterrupted as local storage facilities ran short of space.

Ten bags of various lengths are being monitored on a monthly basis for temperature, bushel weight, grain moisture, and insects. At the end of 2.5 months temperature dropped 20°F, bushel weight did not change (56.1), moisture decreased nearly 2%, and no live insects had been detected (live insects were detected in samples taken during bag loading). However, rice weevils were found stuck to the back of tape used to seal inspection holes on the October 31 sampling date.

OBJECTIVES: The observations are being made to evaluate the feasibility of storing grain for long-term (10 or more months) in the polyethylene bags.

MATERIALS/METHODS: Ten bags from the Jimmy Hays Farm in Calhoun County were filled with corn between August 8–20, 2007. Samples were taken at loading and sent to the Corpus Christi Grain Exchange for grading and aflatoxin level determination. Subsequently, samples were obtained on September 17 and October 31 with a 5-foot grain probe. These samples were evaluated for insects, bushel weight, and moisture level. An electronic grain temperature probe was used to obtain readings from about the middle of the bags.

RESULTS/DISCUSSION: The average temperature of grain being loaded was about 98°F and aflatoxin level averaged 11.5 ppb with a range of 3–25 ppb (Table 1). The higher readings were generally from corn harvested in poorer condition on the later dates of bagging. Bushel weight averaged 56.9 with a moisture content of 12.2%. Grain had dried somewhat between the time samples were taken and analysis. The actual bag moisture was slightly less than 14%. Lower bushel weights were found in 4 samples from the 2 bags loaded last (54.5). Averages of the grain characteristics at harvest are provided in Table 1 which overall was graded 1.3 yellow corn. Insects average 0.28/quart sample, but none were found in the subsequent 2 months. On October 31 grain temperature was about 20°F lower than at harvest, bushel weight had changed very little, but grain moisture had declined nearly 2.0%. Currently, we cannot explain the reason for the moisture differences. The general quality of the corn has not changed in over 2 months since storage.

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Table 1. Characteristics of corn in large polyethylene storage bags, Jimmy Hays Farm, Calhoun County, TX 2007.

Date	Aflatoxin PPb	Temp. °F	Bu.		BCFM %	Da.Kernels %	Live Insects #/qt	Grade
			wt. lb	Moisture %				
8/8–20 ¹	11.5	98.0	56.9	12.2 ²	1.6	1.8	.28	1.3
9/17	–	87.5	55.9	13.9	–	–	.00	–
10/31	–	78.6	56.1	12.1	–	–	.00	–

¹ Loading period for 10 bags.

² Moisture reading decreased in the laboratory while waiting for analysis.