

# TEXAS AGRICULTURAL EXPERIMENT STATIONS

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## THE HEATING OF CORN CHOPS

By G. S. FRAPS, Chemist



POSTOFFICE  
College Station, Brazos County, Texas

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## THE HEATING OF CORN CHOPS.

BY G. S. FRAPS, CHEMIST.

There is usually damage and loss due to the heating of corn chops in Texas in the spring months. The number of occurrences of this kind, and the amount of the loss, were unusually large in the spring of 1912. This was coincident with the fact that the previous corn crops in Texas had been unusually short, and that an unusual amount of corn chops had been shipped in from States north of Texas.

### PREVIOUS WORK.

The author has been able to find little work on this subject. It is known, however, that the spoiling is due to excess of moisture. According to Schindler, an Austrian authority cited by Black and Alsberg (Bulletin 199, Bureau of Plant Industry, United States Department of Agriculture), whole corn is liable to spoil if it contains more than 13 to 15 per cent moisture. Air-dry corn in the northern states contains 12 per cent moisture, if thoroughly dry. Corn containing a greater moisture content has been harvested too soon, or frozen before maturity, or shelled before it has been properly cured on the cob. Corn meal should contain less moisture than the whole grain. Schindler believes that corn containing 15 per cent moisture will yield meal containing  $13\frac{1}{2}$  per cent moisture. Black and Alsberg believe both these limits are too high for the United States.

The spoiling of corn chops is thus probably due to moisture in excess of 13 or 14 per cent.

### MOISTURE CONTENT OF SPOILED CHOPS.

A number of samples of spoiled corn chops was collected by inspectors employed by the Feed Control. The analyses are seen in Table 1.

TABLE 1.—MOISTURE CONTENT OF SPOILED CORN CHOPS.

Sample Number.	
6066	16.80 per cent water
6067	17.66 per cent water
6078	14.26 per cent water
6069	14.29 per cent water
6070	14.71 per cent water
6072	15.87 per cent water
6073	15.12 per cent water
6074	16.04 per cent water
6075	15.95 per cent water
6076	14.45 per cent water
6102	13.26 per cent water
6105	16.01 per cent water
6151	13.44 per cent water
6157	11.61 per cent water
6158	17.53 per cent water

With one exception, these samples contained over 13 per cent moisture. It is possible that some of these lots of chops may have dried out to some extent before the sample was taken.

MOISTURE IN CORN CHOPS SOLD IN TEXAS.

A study was made of the records of analyses of corn chops made by this department for the Feed Control. The average moisture content of all samples registered during the months mentioned, is presented in Table 2.

TABLE 2.—AVERAGE MOISTURE CONTENT OF CORN CHOPS SOLD IN TEXAS.

	1909	1910	1911	1912
January		12.70	11.83	14.00
February		13.71	13.16	14.78
March		12.55	12.17	15.86
April		13.61	13.23	
May		10.86	11.94	
June		10.87	10.65	
July		9.87	9.91	
August		10.02	10.42	
September		9.20	9.72	
October	10.61	9.92	10.65	
November	10.43	10.94	11.10	
December	11.46	10.81	13.15	

The average moisture content for a number of months is less than ten per cent. The average in the years 1910 and 1911 is less than 13 per cent for all months except February and April, but in 1912 the average is over thirteen per cent in January, February, and March. The spring complaints of spoiling corn chops are thus associated with a larger average moisture content of the chops. The unusual number of complaints and loss in the spring of 1912 are associated with an unusually high average content of moisture.

TABLE 3.—TOTAL NUMBER OF CORN CHOPS SAMPLES, AND NUMBER CONTAINING OVER FOURTEEN PER CENT MOISTURE.

Month.	Total.	Over 14%	Total.	Over 14%	Total.	Over 14%
	1909		1910		1911	
November	75		37	1	31	2
December	37	1	35		21	5
	1910		1911		1912	
January	35	3	39	8	25	12
February	29	14	40	15	20	12
March	23	3	21	5	18	12
April	12	2	16	3	18	8
May	26		37	2		
June	8		32	1		
July	3		15			
August	6		20			
September	24		7			
October	37		12			
Total		23		35		51

Table 3 shows the total number of samples of corn chops registered, and the number containing more than 14 per cent moisture. In 1910 and 1911 the maximum number comes in February. In 1912 a large number are found in January, February, March and April.

#### DISCUSSION.

The cause of the molding of corn chops in unusual amounts during the spring of 1912 is due to the shipment into the State of corn chops containing an excessive quantity of water. Corn chops containing over 14 per cent moisture are very likely to spoil under Texas conditions. Corn chops containing 14 per cent or more of moisture are very likely to become damaged, and in such event can only be sold as damaged feed. If damaged corn chops are mixed with other feeding stuffs, the mixture is adulterated, under the provisions of Section 11 of the Feed Law.

Parties importing corn chops should require a guarantee that the chops do not contain over 14 per cent moisture. Shipments containing an excess of moisture should not be accepted. If necessary, the corn should be dried, in kilns or otherwise. The additional expense of drying is small in comparison with the value of the corn, which is almost sure to spoil if it contains an excess of moisture.

Corn containing 10 to 12 per cent moisture may spoil if stored in bulk, or in sacks packed so as to prevent ventilation.

#### SUMMARY AND CONCLUSIONS.

- (1) The spoiling of corn chops is due to excess of moisture.
- (2) If corn chops contain over 14 per cent moisture, they are almost certain to spoil in this State during the warmer months.
- (3) Importers should require corn to contain less than 14 per cent moisture.
- (4) Corn containing over 10 per cent moisture should be well ventilated, or handled, if in bulk, so that it can dry out, especially during warm periods.