Ensiling as an option for drought-stressed corn.

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The lack of rain over the last two weeks and low soil moisture have resulted in medium to severe drought stress impacting corn in central Texas. Harvest of corn for silage is considered by many growers as an option to maintain profitability of the crop. In the following I outline information to be taken into account when a silage harvest is contemplated. Much of this information is derived from work done by T. Dorn, B. Anderson, and R. Rasby at the University of Nebraska and from the National Corn Handbook published by Purdue University.

Before harvesting corn for silage, check the labels of all chemicals applied to that field. Be sure all pesticides (herbicides and insecticides) applied to the crop are cleared for forage and the minimum harvest interval has been met. Check with the USDA Farm Service Agency (FSA) office to maintain compliance with USDA farm program provisions and check with the crop insurance company before harvesting corn as silage

The tendency is to cut drought-stressed corn for silage too soon, resulting in silage with excess moisture, poor fermentation and reduced feed value. Stalks of plants with many or most leaves turning brown will contain considerable moisture. Always test moisture content of a sample before chopping silage. If the moisture content is above 70 percent, either wait to harvest or windrow the corn and let it field wilt before chopping for silage. If drought-stressed corn has pollinated, it is best to delay harvest as long as some green leaf and stalk tissue remains and the black layer has not formed on kernels. Rainfall and subsequent relief of moisture stress can increase grain dry matter and silage quality.

With drought-stressed corn, you can expect to harvest about one ton of silage per acre for each six bushels of corn grain per acre that could have been harvested. For example, if you expect a grain yield of 40 bushels per acre, you can expect 6.7 tons per acre of 30 percent dry matter silage. If little or no grain is expected, a rough pre-harvest estimate of yield can be made by assuming one ton of 30 percent dry matter silage can be obtained for each one foot of height of plant material harvested, excluding the tassel.

Be aware of the potential for high nitrates in the silage and consider the following precautions that may need to be taken before feeding it to livestock. Under most feeding situations, nitrate-nitrogen (NO_3-N) levels over 0.226 percent (2260 parts per million or ppm) in feed are considered potentially toxic. Some laboratories report the concentration of nitrate (NO_3) instead of nitrate-nitrogen (NO_3-N). The potentially toxic level for nitrate is 1.0 percent (10,000 ppm). Nitrate testing of feed is especially important if high rates of nitrogen fertilizer or manure were applied, or if the soil has a high organic matter content. Ensiling drought-stressed corn is preferred to chopping or grazing because ensiling

reduces nitrate levels in the feed. During the ensiling process, one-third to one-half of the nitrate in the forage is converted to gaseous nitrous oxide compounds which leave the silage pile.

Because of the potential of nitrate toxicity and to determine a fair market value, drought-stressed silage should be tested for moisture percentage, nitrate content and feed value before feeding. Samples of the silage should be sent to a forage analysis laboratory. A producer should prepare the sample in the way the laboratory requires it, and make sure that he requires a nitrate analysis, which is a special analysis not included in most routine forage analyses.

The feed value of silage made from drought-stressed corn is usually between 90 percent and 100 percent of silage made from well-eared corn, based on equal dry weights of the two feeds. Generally, crude fiber and protein is somewhat higher and TDN (total digestible nutrients) lower for silage made from drought-stressed corn rather than normal corn. The pricing methods discussed in the following section assume the silage is in the silo after undergoing the ensiling process. Two methods can be used to determine a fair market value for silage; each make comparisons with other feed sources. The first compares the price of silage in the silo to the price of corn. A rule of thumb when pricing normal silage is a ton of 70 percent moisture (30 percent dry matter) silage should be worth 10 times the price of a bushel of corn. Drought-stressed silage may have somewhat lower feed value as compared to normal silage so this price estimate should be corrected based on relative feed value. If drought-stressed silage has 90 percent of the feed value of normal silage, it should be priced at 90 percent of the value calculated above. The second pricing method for silage uses the price for corn and soybean meal. Table 1, from the National Corn Handbook, lists prices for drought-stressed corn silage based on both energy (TDN) and crude protein (CP) content for a range of corn grain and soybean meal prices. To use the table, find the price per bushel of shelled corn across the top and the price per hundredweight of soybean meal down the left side. The cell at the intersection of these two prices gives the value of drought-stressed corn with 30 percent dry matter, 65 percent TDN and 10 percent crude protein. For example: If corn is $2.40 per bushel and soybean meal is $9.00 per hundredweight ($180 / ton) the estimated price of drought-damaged silage in the silo is $23.12 per ton.
No matter which method is used to calculate price, the actual exchange price for drought-stressed corn silage will vary by area, depending on the relative supply and demand.

Sources:

T.Dorn, B. Anderson, and R. Rasby. 2002. Drought-stressed Corn. NF547. University of Nebraska.
National Corn Handbook. Purdue University.

Table 1. Value of drought-stressed corn silage based on corn grain and soybean meal prices.

Price of soybean meal ($.cwt)	Price of corn grain ($/bu)						
	1.80	2.00	2.20	2.40	2.60	2.80	3.0(
6.00	16.97	18.54	20.11	21.68	23.24	24.81	26.3
6.50	17.21	18.78	20.35	21.92	23.48	25.05	26.6
7.00	17.45	19.02	20.59	22.16	23.72	25.29	26.8
7.50	17.69	19.26	20.83	22.40	23.96	25.53	27.1
8.00	17.93	19.50	21.07	22.64	24.20	25.77	27.3
8.50	18.17	19.74	21.31	22.88	24.44	26.01	27.5
9.00	18.41	19.98	21.55	23.12	24.68	26.25	27.8
9.50	18.65	20.22	21.79	23.36	24.92	26.49	28.0
10.00	18.89	20.46	22.03	23.60	25.16	26.73	28.3
10.50	19.13	20.70	22.27	23.84	25.40	26.97	28.5
11.00	19.37	20.94	22.51	24.08	25.64	27.21	28.7
11.50	19.61	21.18	22.75	24.32	25.88	27.45	29.0
12.00	19.85	21.42	22.99	24.56	26.12	27.69	29.2
12.50	20.09	21.66	23.23	24.80	26.36	27.93	29.5
13.00	20.33	21.90	23.47	25.04	26.60	28.17	29.7