

Dryland corn considerations for 2022

Dryland corn in many parts of western KS is struggling. Some areas have been fortunate to receive rain showers that may result in more growth, but in other cases the plants are already dead and on the ground. Dry conditions are reducing production in both native pastures and forages typically used for winter feeding, so making some use of failed corn will help livestock owners to bridge the gap.

Elevated levels of nitrates are a common concern with drought stressed plants. We sampled some dryland corn fields in Thomas County to assess current conditions. Fields 5 and 6 (Table 1) had the least growth and appeared the most drought stressed. Many plants in field 6 were on the ground whereas field 5 was similar in height but still green and upright.

Table 1. Plant growth characteristics of drought stressed dryland corn in Thomas Co. KS collected 7/27/22

Field	Average Plant Height, in*	Average Leaf no. **	Tasseling	% DM	Biomass lbs/acre, DM
1	35.9	14.4	Yes	33.3	5479
2	32.5	15.75	Yes	37.2	5531
3	24.6	12.4	Yes	51.7	6004
4	32.4	13	No	43.8	8271
5	9.2	6.3	No	67.3	1271
6	11.4	7.3	No	45.8	2254
7	18.8	9.3	No	29.3	2627

*Measured from ground to uppermost leaf collar or base of tassel, inches

** Number of leaves with a fully visible leaf collar

Nitrate concentrations in the lowest six inches of the plant were at a level considered dangerous to cattle and were greater than the portion above that point as expected (Table 2). Harvesting forage at 6 inches or higher avoids the greatest concentration of nitrates in the stem base. In the fields sampled, the portion above 6" contained nitrate concentrations in the safe category (<3000 ppm) except for field 7. Field 7 received 2.1" of rain in the 48 hours after the first sample. This moisture allowed the plant to mobilize nutrients and NO₃ levels in the plant above 6" increased 5 and 8 days after the first sample (Table 2), whereas levels decreased in the bottom 6". If this field was being grazed, the recommendation would be to remove animals for 7 to 14 days after the rain. These data provide an example of what is out there but should in no way substitute for testing other fields before feeding or grazing.

Table 2. Nitrate concentration of dryland corn sampled in Thomas Co. KS, 7/27/22

Field	Crude Protein Above 6"	Nitrate, NO ₃ ppm 7/27/22	
		Above 6"	≤ 6"
1	14.3	2677	30472
2	11.1	1051	25299
3	12.4	911	35015
4	11.8	727	21328
5	14.3	3029	30346
6	13.9	2271	28785
7 on 7/27	14.8	6365	76733
7 on 8/1	-	6728	55473
7 on 8/4	-	7133	47681

Weeds growing in two wheat stubble fields were sampled and contained very dangerous levels of nitrates (Table 3). The top 12" of the plants were sampled in plants 2-3 feet tall.

Table 3. Nitrate concentration, NO₃ ppm, in weeds sampled in wheat stubble in Thomas Co. KS

Sample	7/27/22	8/1/22
Kochia	14384	35786
Palmer amaranth	14083	10331

Depending on the stage of harvest and any grain produced, forage quality of drought stressed corn is generally higher in crude protein and 70 to 90% of the energy value of normal corn silage. Even in tasseled fields, crude protein was over 11% in dryland fields sampled. Corn hay could be as good in quality or better than what is typically harvested for forage sorghum hay if adequately dried.

Grazing may be the best option when biomass is low if water and fencing logistics are workable, and grazable plant nitrate content is safe. The base of the plants in fields 5 and 6 were small enough that the entire plant may be consumed. In this case, the lower 6" is 30 -40% of the entire biomass which makes the nitrate level in the base more problematic. If harvested as silage, ensiling reduces the amount of nitrate in the plant by approximately half. Whereas, with haying, any nitrates in the plant at the time of swathing would remain unchanged as it dries and over time. Producers attempting to bale corn hay need to get a very good crimp on the stalk to aid drying. Corn stalks baled too wet can mold and even spontaneously combust. One South Dakota report from 2012 indicated it took 30 days for swathed corn plants to dry from 31.8% DM to 83.8% DM. Baleage may be an option in some areas although stalks may puncture the plastic wrap which would allow heating and spoilage.

Failed dryland corn may fill a gap for livestock producers with limited forage options. Testing prior to feeding will be particularly important with drought stressed plants. For more information, see K-State Research and Extension publication MF3029, "Nitrate Toxicity", at your local county Extension office, or at <https://bookstore.ksre.ksu.edu/pubs/MF3029.pdf>

Sandy Johnson, sandyj@ksu.edu; Jeanne Falk Jones, jfalkjones@ksu.edu ; Dorivar Ruiz Diaz, ruizdiaz@ksu.edu