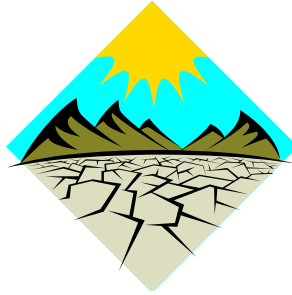


Feeding Risks from Drought Impacted Feeds and Forages



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Mountains & Minds

Topics for Today

- Overall forage quality
- Nitrate toxicity
 - Small grains, corn, sorghum/sudan, weeds
- Prussic acid poisoning
 - Sorghum family

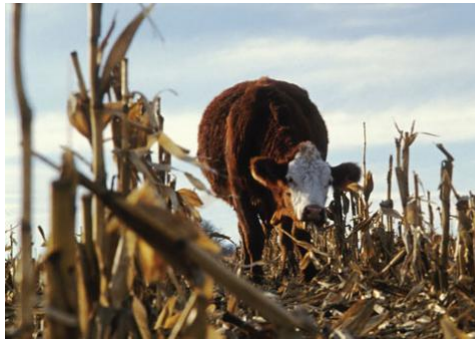


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Drought-Stressed Forages: Overall Quality

- Inhibition of growth
- Legume quality may increase
 - Leaf growth decreases less than stem growth
- Grass quality may decrease
 - Stem:leaf increased

Nitrate Toxicity



What Plants Accumulate Nitrate?

- Annual small grain crops – wheat, barley, millet, oats
- Corn
- Sorghum, sudangrass
- Weeds
 - Redroot pigweed, common lambsquarters, kochia, wild sunflower, Russian thistle, witchgrass, Canadian thistle, black nightshade



Where Do Plants Accumulate Nitrate?

- Highest concentration in stem or stalk
 - Especially lower portion
- For example, lower third of a corn stalk will have the highest nitrates compared to middle or top third



Plant Nitrate Metabolism

- Nitrate uptake is a normal part of plant metabolism
- Nitrate is converted to nitrite, which is then converted to ammonia for protein synthesis



Nitrate and Drought

- Drought conditions favor nitrate accumulation
- Conversion to ammonia occurs in leaves
 - If leaves negatively impacted by drought, nitrate accumulates

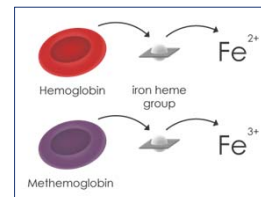
Ruminant Nitrate Metabolism

- Nitrate conversion pathway is exactly the same in rumen as in plants
- High nitrate concentrations overwhelm conversion pathway from nitrite to ammonia



Nitrate Toxicity

- Nitrite ion competes with oxygen for red blood cells
- Nitrite converts hemoglobin to methemoglobin
- Methemoglobin is incapable of oxygen transport



Chronic Nitrate Toxicity Symptoms

- Reduced appetite
- Reduced milk production
- Rough hair, unthrifty appearance
- Weight loss or no weight gain
- Abortion

Acute Nitrate Toxicity Symptoms

- Accelerated pulse rate
- Labored breathing
- Muscle tremors
- Weakness, staggering gait
- Cyanosis
- Death

Small Grains and Sorghum/Sudan

- Test suspect forages
- If concentrations are high
 - Dilute with other, low-nitrate forages
 - Avoid feeding to more susceptible animals
 - Find a feedlot full of steers
 - Worst case scenario: marshmallow roast



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Considerations for Corn

- Highest nitrate accumulation where drought occurs during heavy uptake
 - Drought during or immediately after pollination → potential high nitrate
 - Drought before pollination → probably okay



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Ensiling Drought-Stressed Corn

- Nitrate dissipates during fermentation of silage
 - Should wait at least 3 weeks to feed
- Moisture a concern
 - If ensiled at less than 55% moisture, less fermentation, less nitrate breakdown



Feeding Value of Drought-Stressed Silage

- Drought results in no or partial filling of the ear
 - 90-100% of feeding value of normal silage
- Higher cob:grain means increased fiber and decreased energy



What About Shelled Corn?

- Drought-stressed shelled corn has 92-100% of normal feeding value
 - Lower test weight
 - Market discounts for low test weight may be greater than decrease in feed value



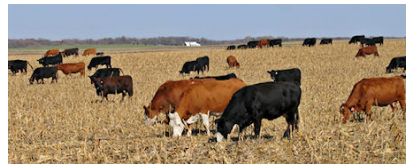
Drought-Stressed Corn Stalks

- Cattle prefer grazing leaves and husk
 - Lower in nitrate
- Drought-stressed stalks may be stunted
 - Cattle will eat lower on the stalk where nitrate is higher



Drought-Stressed Corn Stalks

- Also a concern for corners and edges of drought-stressed irrigated corn
- Producers may leave cattle on stalks longer due to feed shortage
 - Forces stalk consumption



Suggestions for Grazing Drought-Stressed Cornstalks

- Don't turn cattle in hungry
- Fence out pivot corners and edges where plants severely stressed
- Pull cattle as soon as they've eaten most of the leaves and husks
- Consider dosing with nitrate-utilizing bacteria bolus 7-10 d before turnout

What About Weeds?

- Nitrate peaks at pre-bud to bud stages
- Nitrate concentration decreases as weeds mature



Prussic Acid Poisoning



Prussic Acid Poisoning

- Drought-stressed plants produce cyogenic compounds
- In the rumen, converted to cyanide
- Concentrations greater than 0.1% of dry plant tissue considered highly dangerous

Prussic Acid Poisoning

- Symptoms can show within 5 minutes of consumption, death can occur within 15 minutes
- Salivation and labored breathing, followed by muscle tremors, incoordination, bloat, convulsions
- Death from respiratory failure

Prussic Acid Poisoning

- May be associated with periods of rapid growth
 - Shortly after rain or irrigation on previously drought-stressed plants

Preventing Prussic Acid Poisoning

- Don't graze drought-stressed sorghums unless tested for hydrocyanic acid
- Graze second-growth sorghum with caution if poor conditions
- Wait 2 weeks after drought-ending moisture to graze

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The End



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