



NITRATE TOXICITY IN CATTLE DURING DROUGHT

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Risk Factors

Drought



Drought slows plant metabolism leaving nitrates in stems

Fertilizer



Moderately high rates of nitrate fertilizer applied preplant or in season in low moisture conditions increase plant nitrate content

Forage type



Certain plants accumulate more nitrate than others, e.g. sorghum, sudan grass, oats, ryegrass and weeds such as pigweed and lamb's quarters

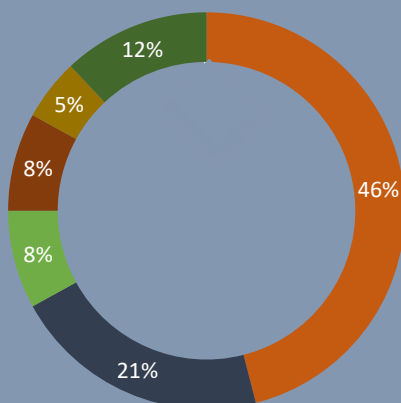
Plant maturity and part



Immature plants and stalks are highest in nitrate content

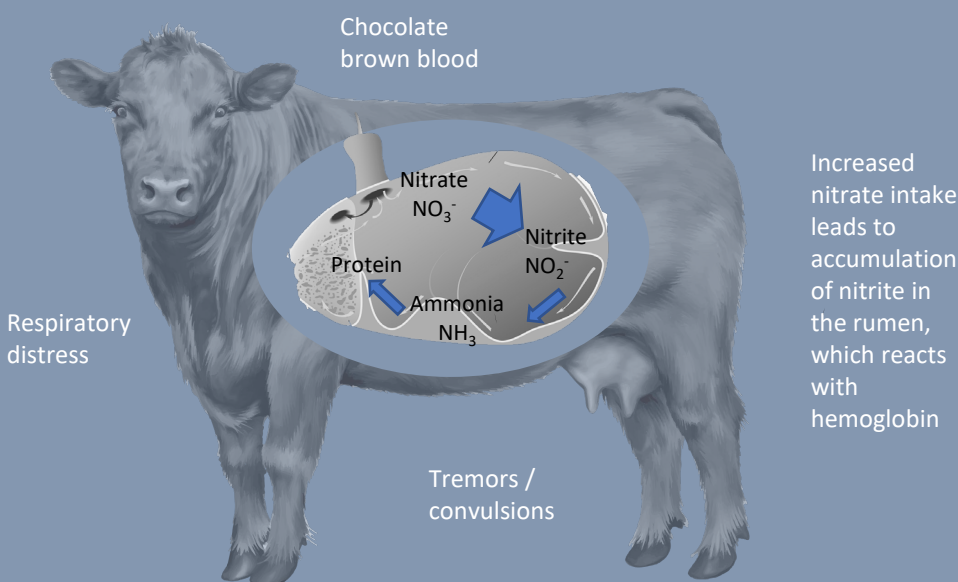
Most common plant poisonings in cattle

Diagnosed at the California Animal Health and Food Safety Lab between 2000 and 2011.

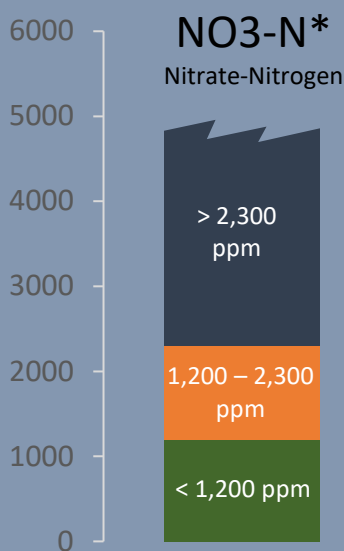


- Nitrate
- Gossypol
- Oleander
- Pyrrolizidine alkaloids
- Oxalates
- Others

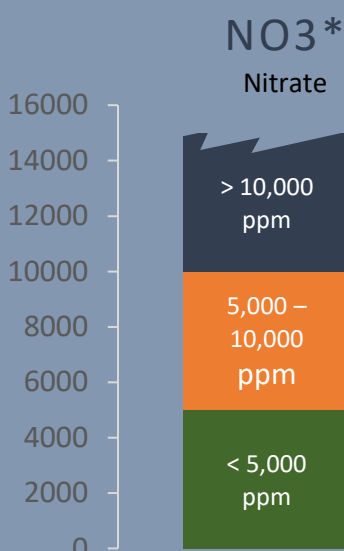
Toxic principle



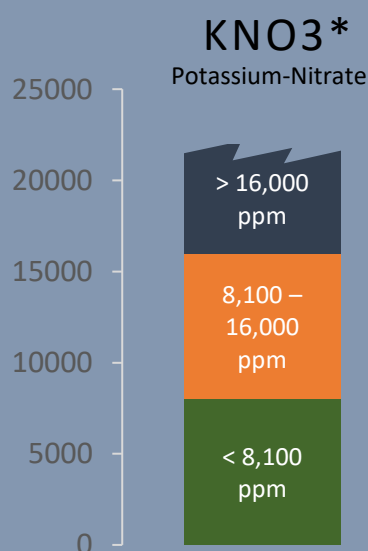
Test result guidelines for hay and forage (dry matter)



Generally safe to feed



Caution: Problems can occur



Do not feed

Management options



Avoid additional fertilizer applications during drought years



Cut forages higher Above ground - nitrates accumulate in lower stem



Dilute high nitrate feed with low nitrate feed. Avoid feeding any feed with > 1.5% NO3* content to pregnant cows



Delay harvest until several weeks after next substantial rain to give plants time to convert nitrate into tissue



Adapt cattle to high nitrate feeds over time. Feed cows before turnout on high nitrate pasture. Avoid pastures > 0.9 % nitrate*

*1 % = 10,000 ppm

References:

- A. Varga and B. Puschner: Retrospective study of cattle poisonings in California: recognition, diagnosis, and treatment, Veterinary Medicine: Research and Reports 2012;3 111-127
- G. Strickland, C. Richard, H. Zhang, D.L. Step Nitrate Toxicity in Livestock, Oklahoma Cooperative Extension Service PSS-2903 <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-1996/PSS-2903web.pdf>
- Alleviating Worries for Nitrate Poisoning and Prussic Acid Poisoning” by Josh Davy and Birgit Puschner in Livestock and Range News, Tehama, Glenn, and Colusa Counties, August, 2017 http://ceteahama.ucanr.edu/newsletters/Livestock_-_Range_News70582.pdf
- Cornell University Cooperative Extension: Drought Risk of Nitrate Toxicity in Forages, Fact Sheet 70 <http://nmsp.cals.cornell.edu/publications/factsheets/factsheet70.pdf>