**Nitrates in Forages**

I recently wrote about the potential for Prussic Acid in forages, due to the drought stressed conditions we are under. Nitrate poisoning from stressed forages is at least as serious if not more so than prussic acid poisoning. Unlike prussic acid, nitrates do not leave the plant through volatilization during the hay curing process or in the ensilage process, levels may actually increase. The only way for a plant to decrease nitrates is through active growth. It takes approximately 5 days of active growth to significantly reduce nitrate levels in a plant.

All forages contain some nitrates, when digested in the rumen the nitrates convert to nitrites to ammonia to amino acids and then to protein. If an animal consumes high concentrations on nitrate it cannot complete the conversion to protein. The animal will convert the nitrates into nitrites and they will be absorbed into the blood. The nitrites are absorbed into the bloodstream and nitrite poisoning takes place by converting the hemoglobin into methemoglobin. Methemoglobin cannot carry oxygen and the animal can die from lack of oxygen or asphyxiation.

**Conditions that can cause nitrate poisoning:**

* When the temperature is high, and moisture is adequate, plants may undergo a process called photorespiration. Photorespiration produces carbon dioxide rather than assimilating carbon into energy building blocks (i.e., sugars, carbohydrates, etc.). This may cause nitrates to accumulate.
* When the soil contains nitrate nitrogen but little soil moisture, nitrates are highly concentrated in the water plants take up. Plants don’t have enough water to continue growing and nitrates accumulate.
* Herbicide injury can limit the conversion and assimilation of nitrates in plants. After herbicide applications, check the field, especially field edges, for forage plants affected by off-target herbicide drift.
* Also, if you have a field that has been fertilized with high rates of nitrogen but has been very dry it can have rapid uptake of nitrogen after a good rain. This could be the case in some hay meadows that were fertilized and never received rainfall. With the lack of grazing, you may want to hurry and turn cattle into the fields following a rain. It is best to wait a few days. Again, five days of active growth are needed to significantly lower nitrate levels in plants.

The amount of time that it can take for nitrate poisoning to occur depends upon the level of nitrates in the forages.

**Some causes of nitrate poisoning are:**

* Forage consumed contains high levels of nitrate
* The diet changes rapidly or suddenly
* Parasitism or other conditions causing anemia
* Livestock consume supplements of urea or high protein feeds along with forages with moderate or high levels of nitrate
* Livestock directly consume nitrite

**A few tips to help reduce the potential for nitrate poisoning:**

* Do not turn hungry animals into possible high nitrate forages
* Have hay tested before feeding if it is possibly high in nitrates (**nitrates will remain in cured hay**)
* If hay is high in nitrate, feed in moderation and with other sources of hay and energy supplement. Do not feed high nitrate forages free choice.

For more information on nitrates or on testing for nitrates, give us a call.