Vitamin A Deficiency: May be a Concern in Spring-Calving Beef Herds

Rachael Brooke
Phillips-Rooks District Extension Agent
Agriculture and Natural Resources

Vitamin A deficiency can present with many different clinical signs, but the most common signs are weak or stillborn calves. In this article, we will discuss some possible reasons why this may occur in our spring-calving beef herds.

Deficiency timing: Fresh, green forages contain very high levels of Vitamin A (as carotenes). It is rare for Vitamin A deficiency to occur during a normal pasture season. We do occasionally observe deficiencies in the pasture season during drought conditions. As the grasses become dormant (have turned from green to brown color), the Vitamin A content will decrease and the pasture may not provide the appropriate amount of required dietary vitamin.

Vitamin A deficiency is primarily a winter issue. Cows on green-grass pastures will store Vitamin A in their livers. During late fall and winter, when Vitamin A intake is not sufficient, they can use this storage supply to meet metabolic demands. Unfortunately, the storage supply only lasts between 2 and 4 months.

Harvested forages that are still green in color will also contain some Vitamin A, but at very low levels. This vitamin is the least stable of all vitamins and elevated temperatures, light, presence of oxygen, and humidity negatively affect its stability. Therefore, during the harvesting, curing, and storing process a large amount of Vitamin A is lost.

Supplementation: Most herds will supplement Vitamin A through a trace-mineral/vitamin pack supplement. Unfortunately, we do commonly see Vitamin A deficiency in supplemented herds. What might explain this?

Some mineral packs do not contain the appropriate amount of Vitamin A. Normal free-choice mineral/vitamin supplement consumption is 2-4 ounces per head per day. To meet the needs of a 1,400-cow consuming 2 ounces of mineral, 300,000 IU of Vitamin A per pound of supplement would be required. If consuming 3 ounces of mineral, this concentration would need to be 200,000 IU/lb. A large percentage of these supplements contain less than 150,000 IU/lb.

Another consideration is supplement intake amounts variation between cows. Some research suggests up to 14% of cows do not consume any dry mineral supplement at all, and the variability between animals that do is very large. Lastly, it doesn't matter what level of Vitamin A is contained in the supplement if it isn't consistently available for consumption. Cows can't eat what is not available!

As mentioned above, Vitamin A is very unstable and affected by many environmental factors. Mixing Vitamin A with trace minerals (particularly inorganic forms) increases the level of instability. When not mixed with a trace mineral, about 1% of the pure Vitamin A product potency is lost per month. After mixing, the losses can approach 9% per month. A trace mineral/ vitamin product purchased today may contain 50% less Vitamin A when fed six months later.

One common question about supplementation concerns administering an injectable Vitamin A product. In some cases, supplementing with this method does make sense. For example, a herd that is presently experiencing a deficiency can administer the injectable to those dams that have not calved which will have immediate effects. Another example would be when a herd has not been adequately supplemented and has been fed harvested forages for an extended period. The negative aspect of injectable Vitamin A is the short period of effectiveness. Vitamin A tissue levels are increased for about 1-2 months after administration; therefore, administration timing is critical. To help unborn and neonatal calves, administering to cows as close to expected calving would be appropriate. Excessive Vitamin A can be toxic; therefore, using your veterinarian's advice on product and dosage is very important.

Summary: Fresh, green forages contain large amounts of Vitamin A; therefore, supplementation levels during a normal pasture season are minimal. Once pastures have become dormant or when feeding harvested forages, Vitamin A supplementation levels need to be increased to the appropriate level. Considerations to normal supplement consumption amounts of most vitamin/trace mineral products, it is important that these products contain the appropriate level of Vitamin A. It is important that supplementation products be available to the cows at all times to optimize consumption levels. Minimize the storage of Vitamin A containing products to only a few months given the instability of this vitamin. Injectable Vitamin A can be beneficial in some cases, but appropriate dosage and timing is critical.

For more information, please contact the local K-State Research and Extension Office.

Article written by: Gregg Hanzlicek, DVM, Kansas State University Veterinary Diagnostic Lab