

Central Washington Animal Agriculture Team



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Selenium: Essential for Livestock Health

Dr. Susan R. Kerr, DVM, PhD
WSU Klickitat County Extension Director

Tragically, the first time some livestock producers hear the term “White Muscle Disease” is during the necropsy of one of their animals. What causes this serious disease and more importantly, how can it be prevented?

Cause of White Muscle Disease

White Muscle Disease (WMD) is caused by a deficiency of either of two important nutritional anti-oxidants: Vitamin E and Selenium. Anti-oxidants help protect cell membranes from the oxidizing effects of toxins, free radicals, normal metabolism and other factors that destroy cell membranes. Young, growing animals are rapidly creating muscle mass, so Selenium deficiency shows itself most commonly as muscle cell degeneration.

There are various areas of the country that are deficient in Selenium and other areas that have toxic levels. Pacific Northwest soils are generally low in Selenium, as are feeds that are grown here.

Signs of Illness

Some of the signs of Selenium deficiency depend on the tissues that are affected. Young animals may appear stiff, lame or weak; spend most of their time lying down and resting their chin on the ground;

have diarrhea; and be unthrifty, chronic poor do-ers. If the muscles involved with swallowing are affected, food can be inhaled instead of ingested, which causes aspiration pneumonia. Animals may die very suddenly during exercise if heart muscle is involved. In pigs, Selenium deficiency can also cause liver degeneration.

Selenium deficiency manifests itself much differently in adult animals. Instead of muscle degeneration, weakness and death, Selenium-deficient adults tend to have chronic infections and reproductive problems. Examples include chronic mastitis, chronic pneumonia, retained placenta, infertility and miscarriages.

Diagnosis

As alluded to previously, an experienced eye can often detect WMD during necropsy. Look for soft, pale, white areas of muscle where you expect to see normal-looking firm, red muscle. The most common muscles affected are those in the tongue, heart and at the back of the thigh. Cut across the muscles and look for bands or stripes of muscles that are paler than surrounding muscle.

Selenium is associated with a serum enzyme called glutathione peroxidase, so blood tests can be conducted to assess Selenium levels. Selenium also can be

measured from biopsied or post-mortem liver samples. In some cases, a diagnosis of Selenium deficiency is made by the animal's response to treatment.

Treatment and Prevention

The only bright spot concerning WMD is that it can be both treated and prevented. Injectable products containing Selenium and Vitamin E are available from veterinarians or by prescription. As always, if you want to use one of these products in a species or dose not listed by the manufacturer on the bottle, you must first get approval from a licensed veterinarian with whom you have a valid client-patient-veterinarian relationship. Make sure to abide by all meat and milk withholding times required for the medication. Typically, injections are given to clinically-affected animals or to healthy animals once or twice a year for prevention. Toxicity is possible, so make sure to use recommended dosages and record treatment dates carefully. This is NOT a case of "if a little is good, a lot is better!"

In Selenium-deficient areas such as ours, Selenium can and should also be supplemented through trace-mineralized salt and concentrates on a daily basis. Your veterinarian or extension agent can work with you to design a Selenium supplementation program that is best for your herd.

Summary

WMD is a common, serious but preventable disease of young livestock, causing poor performance and death. The adult form of this deficiency also affects animal health and performance in less dramatic but chronic ways. Responsible livestock producers will learn about WMD and other Selenium-responsive diseases and develop a prevention program for their animals. Don't learn about WMD the hard way!