

Liver Flukes and Redwater: What's the Connection?

Most of us in California have seen liver flukes in cattle. Most of us vaccinate our cattle at least once a year to prevent Redwater. I have had a number of questions recently about both of these cattle health problems, so I thought I would spend a little time this month discussing the connection between the two and answering some of the common questions about prevention of problems due to flukes and Redwater.

Where do liver flukes come from?

The flukes are on the grass the cattle eat! As odd as this sounds, that is what happens. The common liver fluke of cattle, *Fasciola hepatica*, does have a strange life cycle. The cattle eat grass with an encysted stage of the fluke present. After the cattle eat this contaminated grass, the juvenile flukes "burrow" through the lining of the intestine, escape into the peritoneal cavity (the inside cavity of the abdomen) and migrate to the liver. The flukes bore their way into the liver and over the next 6 weeks or more make their way to the interior of the liver and finally arrive in the bile ducts where they begin to lay eggs. The fluke eggs are shed into the manure of the cattle. These eggs hatch and make their way to fresh water snails. They infect the snails (burrow into the snail's body) and undergo additional development. Eventually the young flukes emerge from the snails and encyst (form a resistant coating) on the blades of grass. When cattle ingest the grass with the fluke cysts, the life cycle is completed.

What damage do the liver flukes cause?

The young flukes can cause quite a lot of damage as they migrate through the liver. If only a few flukes are migrating through the liver at one time, the damage to the cattle is minimal. However, if many flukes are migrating at the same time, the damage to the liver can be extensive. In these cases, diarrhea, weight loss, and jaundice (yellow mucous membranes) can be observed. Another problem liver flukes seem to cause is decreased fertility. Studies have been published that show decreased pregnancy rates in replacement heifers and increased age to puberty in heifers infected with liver flukes. Thus, flukes can directly cause losses by (1) damage to the liver, with weight loss and diarrhea, and (2) decreased reproductive performance.

What causes Redwater?

Redwater is caused by a bacterium called *Clostridium hemolyticum*, which colonizes in the liver of susceptible cattle and produces protein toxins that in turn destroy the body's red blood cells, damages other organ systems and rapidly causes death. Migrating liver flukes damage small areas in the liver and cause low oxygen tension and these bacteria prefer these conditions and begin to grow rapidly in these damaged areas.

The disease has a short incubation period and the vast majority of affected cattle are usually found dead and bloated. This is the connection between liver flukes and Redwater—the migrating flukes damage the liver and the Redwater bacterium grows in these damaged areas and causes disease.

How common is Redwater?

The disease is common in the western United States and the first cases were reported in California in 1916. Most areas of California are at risk for this disease. It is most common in areas with alkaline soils, water with a pH of 8, and in pastures that are not well drained. The agent is often present in the feces of normal cattle and has been isolated from the liver and kidneys of healthy cattle. Redwater is uncommon in cattle less than one year of age. The most commonly affected cattle are adults in good condition.

The disease has a very short incubation period and the vast majority of affected cattle are usually found dead and bloated. If clinical signs are observed, the most common ones are anemia, rapid breathing, high fever (104-106°F), and urine that is dark red and foamy in appearance. The red urine is due to the presence of large amounts of hemoglobin from the destroyed red blood cells. The affected animals are weak, depressed and usually die within 12 hours of the time the first signs appear. Treatment is almost always unsuccessful even if the animals are seen prior to death. The course of the disease is very rapid and most all cattle with Redwater are simply found dead and most bloat soon after death. Other conditions that can be confused with Redwater include (a) Leptospirosis, (b) legume bloat, (c) copper toxicity, (d) anaplasmosis, (e) anthrax, (f) bracken fern toxicity, and (g) blackleg. Therefore, animals that die suddenly should be examined by your veterinarian or sent to the diagnostic laboratory to determine the cause of death so that other losses can be prevented. Your veterinarian can easily identify Redwater as the cause of death and can take impression smears of the liver to confirm the condition.

What can I do to minimize fluke damage?

Our best option is the use of drugs to kill the flukes during strategic times of the year. The timing is dependent on the individual ranch. Killing the adult flukes that are residing in the liver of cattle ***before*** turning them onto clean pastures seems to be the most cost-effective strategy. This not only kills the flukes; but it prevents further shedding of eggs onto the pastures. Maximum transmission of flukes occurs in spring and summer in warmer regions and late summer to fall in cooler regions. Depending on your pasture rotation schedule, the use of drugs to kill flukes in the fall and/or late winter to spring should be considered.

Currently, there are two drugs available that are effective against liver flukes in cattle. Both work best against the adult flukes, but there is some effect on the migrating juvenile flukes. Clorsulon is effective only against liver flukes and it is sold alone as Curatrem® or in combination with ivermectin as Ivomec® Plus. Thus, Curatrem® can be used to kill the flukes or Ivomec® Plus can be used to kill the flukes plus the internal

parasites (worms) and external parasites (sucking lice). Additionally, albendazole (Valbazen®) has activity against flukes and internal parasites.

How can I prevent Redwater?

The most important means of prevention is the routine use of Redwater vaccines (bacterins) to increase the immunity of the cattle. Animals should be vaccinated at least once per year in areas where the disease occurs. An excellent time for boosters is in the late spring or early summer, ahead of the time of year when this disease is most common. The vaccines used to prevent Redwater do not provide long-term protection and exposure to a large number of organisms seems to override the protection provided by a single yearly booster. In areas of high exposure cattle may have to be vaccinated every 6 months or in some instances more often.

Your veterinarian can give you excellent advise about the vaccine frequency that works best in your locale. Also, it is very important that all animals that die suddenly be examined to determine the cause of death as Redwater is so common and can easily be confused with other conditions. The Redwater vaccine is made separately or is combined in "8-way Clostridial vaccines". The combination Clostridial vaccines, "5-way or 8-way", should not be confused with 8-way respiratory vaccines that contain virus antigens and Leptospirosis vaccines. Also your veterinarian can advise you regarding the best drugs and appropriate time of administration to control liver flukes in your cattle.

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