



Production-limiting Diseases of Sheep -- Johne's; Maedi Visna

Johne's Disease

What is it?

Johne's Disease has been identified as an important production-limiting disease of sheep world wide. Caused by the bacteria *Mycobacterium avium* subspecies *paratuberculosis*, this disease causes severe inflammation and thickening of the small intestines. Infection with this bacteria will usually result in wasting in sheep and diarrhea in about 20% of cases in the end stages of the disease ¹. Because there are other diseases that can cause wasting in sheep many Johne's cases go undiagnosed. Besides direct impact to sheep health and production, Johne's is of concern because it has a potential association with Crohn's Disease ² in humans. Recent work has shown that the current prevalence rate of Johne's within Saskatchewan is 2% with 43% of flocks having at least one positive animal ³.

How does the disease work?

Johne's disease causes a chronic diarrhea caused by a specific bacteria. It is primarily transferred from animal to animal by the fecal-oral route (one animal ingesting the feces of another) but may also be transferred through milk and may even cross the placenta. Most animals are infected in the first few months of life, normally from their mother. After an animal has been infected it can either clear the infection or the bacteria may invade the tissues causing a long-term persistent infection. The infection is usually isolated to the small intestines where it prevents or inhibits the proper absorption of nutrients. The most complicating factor associated with Johne's disease is that the animal may not actually show signs of sickness until years after the initial infection (long incubation period).

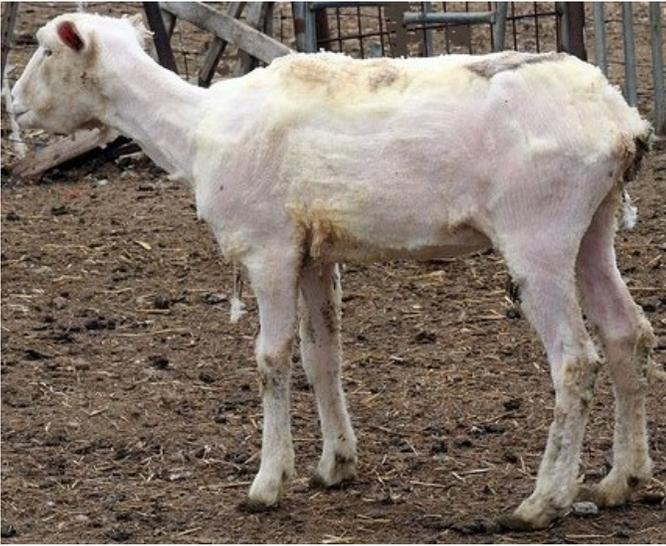
What do I look for?

Because of the long incubation period for this bacteria most animals don't show signs until a minimum of 2 years and at most 7 years of age. The most common and consistent sign of disease in sheep is weight loss, which as we know is a fairly vague sign. While diarrhea is very common in cattle who have this disease it is only seen in about 20% of sheep infected with this bacteria ⁴.

Because of the poor absorption from the intestines, animals with Johne's Disease often become low in protein. This will often manifest itself as "bottle jaw" or swelling under the jaw bone. Signs such as diarrhea and bottle jaw will often be seen during times of high stress (ex: lambing and weaning), although it can be seen at anytime in the production cycle.

How is Johne's Disease diagnosed?

Johne's disease can be difficult to confirm in live animals. In previous years the only method we had was through a fecal culture which has its limitations (the worst of which was the 8-14 weeks it took to get results from the test). The most effective and quickest method to diagnose Johne's is through a blood test. This blood test can be done on animals who are currently showing signs of Johne's. Its drawback is that it can give you false negatives. This means that just because an animal's test comes back "negative" it isn't always truly negative. The best method for diagnosis is the submission of small intestines to a pathology laboratory from mature deceased animals that had signs consistent



with Johne's disease.

Can I treat Johne's Disease?

Unfortunately once you actually notice the signs of the disease, too much damage has been done to the intestines. While it would make sense that an antibiotic should kill the infection, the infection has already been going on for 2-7 years and antibiotics are unable to reverse all the damage that has been done to small intestines. This makes prevention the only hope for controlling this disease.

How can I prevent Johnes' Disease?

While prevention is the only way to control this disease it is still very difficult. The main issue with prevention is the long incubation period. It is possible that you can bring an animal into your flock years before it actually shows any signs of illness. So while everything looks fine with the flock, that new animal is busy infecting other sheep with Johne's. Preventing the introduction of the bacteria into your flock is imperative. This can be done by several different ways but the method that will likely be easiest is to inquire about the current prevalence within the source flock. If a producer has no idea about his or her current prevalence, it might be a good idea to avoid that flock. Alternatively, ask them to sample about 10% of their flock and have it submitted to a laboratory. Very few flocks will be found to have no Johne's present but it should be less than about 5% for you to consider purchasing from that flock. Once you have had a positive occurrence in your flock several control measures can be taken but nothing is 100% effective. Control should be aimed at decreasing oral contact with fecal material. This may include: decreased stocking densities, providing raised clean drinking water and frequent sanitation of pens where susceptible animals congregate (lambing jugs, etc.). Any animal who tests positive as well as their offspring should be culled. Alternatively, if testing is not possible or affordable, any animal who is exhibiting signs that could be consistent with Johne's disease should be culled (as well as their offspring). Although there are some vaccines available for cattle, their effectiveness is limited and similar vaccines have not been established for sheep. While it is easy to emphasize prevention, implementing a prevention program can be very difficult. Discuss a feasible and practical biosecurity program for your flock with your veterinarian.

References:

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Ovine Progressive Pneumonia (Maedi Visna)

What is it?

Maedi Visna or Ovine Progressive Pneumonia (OPP) as it is more commonly called in North America; is a disease caused by a lentivirus (a virus with a long incubation period) with its major sign being a long standing pneumonia. After initially being found in South Africa and the United States ¹, it is now known to be one of the largest causes of production loss in North America. Within Saskatchewan a recent study showed that the rate of infection is 4.6% with about 35% of flocks having at least one positive². Infections can be clinical (showing signs of OPP) or non-clinical (not showing signs of OPP) and routine blood testing cannot tell us the difference between these two. While researchers have tried to experimentally infect other species, sheep and goats are the only ones who were able to become infected. Although there have been studies to look for differences in breed susceptibilities, none of them have been able to prove a higher incidence in one sheep breed over any other.

How does it work?

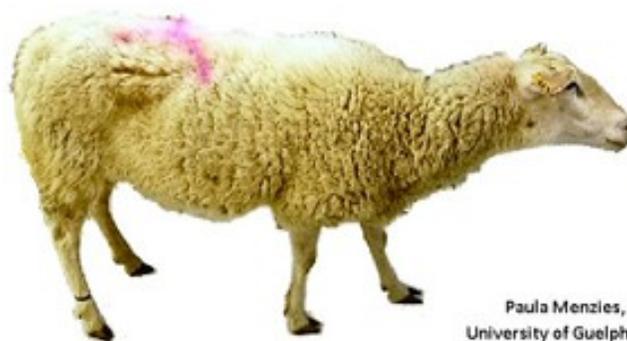
OPP operates with what we call a direct transmission or colostral transmission. This means that the virus is most often transmitted from animal-to-animal or mother-to-offspring. The virus can be transmitted animal to animal through close contact and most likely through respiratory route. Animals most often become infected as a lamb but the lamb's exposure dose, genetic factors, and housing situation seem to play roles in determining if a lamb will actually develop clinical disease. Animals who are infected by their mother usually occurs through the milk right after birth. Because of the long incubation period, clinical signs usually develop when the animal is 3 to 4 years old. Regardless of whether or not there are clinical signs, after a sheep becomes infected it remains infected. The virus tends to live in the lungs, brain and blood producing organs and there it can cause problems or just continue to incubate.

What do I look for?

Animals who are suffering from OPP will typically be over the age of 2 years because of the long incubation period. Animals that actually get sick with OPP will often show signs of illness after times of stress (lambing, bad weather, shipping, etc.). In the early stages of the disease the sheep are very listless and seem generally unwell, people will describe them as "just being off".

This will progress to weight loss and eventually difficulty breathing especially when being moved. Respiratory signs should be a red flag to you as a producer as animals of this age don't typically get bacterial pneumonias like a young lamb would get. Even with all of these signs, most sheep will maintain their appetites and have a normal temperature. In the end stages of the disease there may be open mouth breathing, flaring of the nostrils and intense coughing. Other less commonly seen signs may include: arthritis, mastitis, brain infections, and hind limb weakness. The mastitis is what you'll often hear called a "hardbag" where the udder is very hard and while milk production is low it is still normal in appearance. Sheep who experience the hind limb weakness will often start with some mild stumbling and abnormal gait but may progress to total paralysis over the course of weeks to months.

The more important cases are those that are non-clinical as they likely have huge effects on productivity. These non-clinical cases are usually found to have lower conception rates, lower birth rates, and even reduced growth rates in the lambs ³. The lambs that have lower growth rates would likely be a direct result of the lower milk production from the ewes. Any ewe that consistently produces poor doing lambs or is having conception rates that seem lower than expected should be



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suspected for OPP.

How is OPP Diagnosed?

OPP should be suspected in any animal that is at least 2 years of age and has progressive disease with slowly developing respiratory effort, neurologic signs or arthritis. Exposure to the virus is quite easily detected with blood samples although the test cannot tell the difference between animals who are currently sick and ones who are just carriers. There are some newer tests that actually detect the virus in the blood but finding labs that perform such a test can be difficult. The current test is most often aimed at detecting non-clinical carriers with the idea of culling them before they actually become clinical. When trying to detect OPP in your flock it may be beneficial to collect "pooled" samples before starting to test each animal individually. Pooled samples allow us to identify if there is a positive animal within a group, if there is then we can go to individual testing.

Can I treat OPP?

Because this is caused by a virus there is no treatment that is available for OPP. Animals that you suspect have OPP should be tested and then humanely euthanized. When animals are showing clinical disease there is a case fatality (death) rate of 100%, meaning that any animal who is infected and showing signs will eventually die. Non-clinical animals also will not respond to treatment and the fact that an animal is not responding to a treatment as you maybe have expected should also raise your suspicion for OPP.

Can I prevent OPP?

Although it is a virus, OPP currently has no available vaccines and because of its genetics making a vaccine would be almost impossible. The best possible way to prevent this infection is by keeping a closed flock (not allowing any new additions). Bloodwork may be performed on the entire flock and any positive animals culled in addition to any of their offspring that are less than 1 year of age. In order to be considered a negative flock the farmer should test the entire flock twice a year until two tests in a row come back negative (whole flock testing). If having a closed flock is not an option and one wishes to remain negative, any incoming animals should be tested before being allowed on the premises. Control of this disease can be very difficult, time consuming and costly. Before starting to test your entire flock, establishing if you have the virus at all is an important starting point.

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