Neospora in Beef Cattle

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What is Neospora?

Neospora caninum is a single celled, parasitic protozoal organism, and the most commonly diagnosed cause of bovine abortions in many regions of the world. Although it may be more common in dairy cattle, beef herds are not immune to it. In the US, studies found a median seroprevalence of 13% in beef cattle estimated to cause an annual loss of US $111 million. Cows and other ruminants are intermediate hosts, while dogs and other canids are definitive hosts, in which *Neospora* undergoes sexual replication. Dogs, coyotes, or gray wolves typically get infected through consumption of aborted fetuses or infected meat. They will pass the infective form of *Neospora* called oocysts in the feces. When oocysts are accidentally ingested by intermediate hosts such as cattle, they sporulate in the gut and release so-called tachyzoites, which make their way out of the gut and into muscle as well as through the placenta to the developing fetus. The outcome is an aborted fetus, a mummy, a stillborn calf, or rarely a calf born with neurologic deficits such as abnormal gait or birth defects. However, transmission can also occur from infected cow to her fetus where a normal calf is born. Birds, including chickens, sparrows, and crows have also been identified as intermediate hosts and may contribute to the dissemination of *Neospora* when eaten by canids, but more research is needed to confirm. People do not seem to become infected with *Neospora*.

Can cows transmit *Neospora* between each other?

A cow can only infect her own fetus with *Neospora*, there is no cow-to-cow transmission even when a cow aborts from *Neospora*.

What do you see in affected cattle?

Aborting cattle show no other signs of disease and abortions can happen at any time during pregnancy starting at 3 months but are most common during mid-gestation between 4 - 7 months of pregnancy. There may be abortion storms where many cows abort at the same time or there may just be an uptick in abortions above the background level that typically occurs during a season. Infection in early pregnancy may lead to more severe consequences though than infection during the last trimester of pregnancy.

Is there a vaccine or treatment?

No commercial vaccines are available, neither are any drug treatments. The only option to deal with *Neospora* is through management and preventive measures.

How do you know you are dealing with *Neospora* abortions?

It is always good to call the diagnostic lab and ask what tissues they would like to have submitted for a particular case. In general, for abortions, placenta, fetus, and blood from the dam are all important. For *Neospora* in particular, the most common sites to find it in the fetus are in the brain, heart, or liver. If you don't have a placenta or a fetus, which is often the case, it might still be helpful to submit blood from cows that have aborted and those that have not aborted to support a diagnosis of *Neospora* abortion. A positive test means that the cow was exposed to *Neospora* in the past, will stay infected for life, and is more likely but not guaranteed to abort because of it. Infected cows may also test negative on a blood test early in the infection but will likely test positive later on. Serial blood tests several months apart can help detect those cases.

It is not known what triggers the recrudescence of *Neospora* once a cow is infected. Recrudescence means, she got infected sometime in the past, *Neospora* formed tissue cysts in muscle that stay mostly undetected by the immune system, but later on, *Neospora* causes an abortion. Stress, disease, pregnancy, or other immune-suppressing events may be involved, but the science is still lacking to clearly define the cause of recrudescence.

Should you test herd additions?

If you are concerned about *Neospora* in your herd, it is good to ask about abortion history in the seller herd. To be on the safe side, an ELISA screening test will help to eliminate those that test positive and who might be at higher risk of *Neospora* abortion in the future.

How to manage *Neospora* once you know it's in the herd

Testing and culling may be one option, depending on the percent positive in the herd. However, that may not be feasible if there are a lot of cows that test positive. Another option is not to keep replacement heifers from positive cows or test them before making that decision, so the problem does not propagate. Testing calves before they drink colostrum would be ideal, so there is no confounding with maternal antibodies. Since there is very little chance of positive cows transmitting *Neospora* other than to their own calves, keeping those cows does not elevate the risk of *Neospora* infections or abortions in other cows. Positive cows are more likely, however, to abort or have a calf that is infected in utero.

What about cows with high genetic merit that test positive?

Embryo transfer is a way to protect a calf from a dam with high genetic merit and that has tested positive. Make sure the embryo recipient tests negative. In this manner, you can still take advantage of a cow's genetics without running the risk of a *Neospora* abortion.

What about dogs and coyotes?

There is no good test for dogs and they are only infected for brief periods of time. It is therefore not recommended to get rid of dogs on the ranch if there is a problem with *Neospora*. Keeping dogs from defecating anywhere near feed is an important control measure though. In addition, promptly cleaning up any parts of the placenta or aborted fetuses so dogs don't have access to them is important as well. Protecting feed sources from coyotes, and having a rodent control program, so coyotes aren't attracted to feed sources that may be infested with rodents, can also lower the risk.