

If you experience unexplained death loss, a necropsy may open the door to answers needed to protect your herd.

by Corinne Patterson

Animal death loss isn't fun. It's certainly not something producers want to think about. But it is a reality of the business and can happen regardless of the management level, says Jeffery Hall, a veterinary toxicologist at the Utah State University (USU) Utah Veterinary Diagnostic Laboratory.

In cases where unexplained death losses occur, a necropsy may help producers understand what's going on in their herds.

"In all honesty, necropsy is probably underutilized as a health tool because the animal is dead, so it's a dead loss anyway," says Tom

Baldwin, a veterinary pathologist and director of USU's state lab. "[Producers would rather] move on and worry about the live ones. I think they forget that there's data in that dead one that might help them make decisions."

A necropsy is simple in its idea — a process of searching for answers — as enlightened to the general public by the TV show "CSI: Crime Scene Investigation." Similar to the show, a team of scientists works together to provide answers to those seeking the truth about their losses.

"Being a diagnostician is kind of like going to Wal-Mart and buying a 1,000-piece

jigsaw puzzle, randomly reaching in and throwing away 250 pieces of the puzzle, then putting the puzzle together," Hall says. "As a diagnostician you want to have enough pieces of the puzzle so you can describe what the picture would have looked like if you had all the pieces, but you are never going to have all the pieces."

So why should producers be concerned with the big picture and put forth the time and money to have a death-loss puzzle solved?

"The most important information to a producer is the identification of conditions that have the potential to affect herdmates," Baldwin points out. Certain diseases or

nutritional deficiencies may or may not affect the rest of the herd, and knowing whether the risk is or isn't there by having a necropsy performed may mean the difference between saving or losing more livestock.

The team at work

A veterinary pathologist is the point person on the necropsy team, coordinating the case, directing sample flow and interpreting ancillary, or supplementary, lab findings, Baldwin says. In some cases a local veterinarian may travel to the ranch to perform a postmortem examination, which

generally depends on availability and the comfort level of the attending veterinarian. Baldwin says there are many veterinarians capable of doing so. However, a local veterinarian still works with a pathologist and a laboratory to have ancillary work performed.

When producers plan to bring a death loss directly into a pathology lab, they should provide a relevant history of the animal. Important information may include producer observations, medical history, nutritional history, environmental conditions, or factors such as stage of gestation or age that the condition may be related to.

Baldwin says he is sometimes faced with producers who are hesitant to come forth with critical information for fear of condemning themselves for various reasons. He reminds producers he isn't a sheriff and has no legal interest.

"Be open about what this animal has been treated with," he says. He recalls a common situation where he was fairly certain that he was looking at a case of bacterial pneumonia. After sending multiple sections of the lung to the bacteriologist, the lab was unable to grow the bacteria, and in a case of a bacterial disease, the bacteria must be grown to identify it as the cause of death.

"The most common reason for not being able to grow bacteria is that someone has given the animal a whopping dose of antibiotics, and it's killed the bacteria,"

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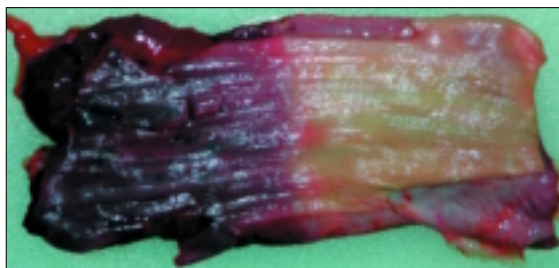
► **Above:** Sometimes animals die from causes that won't affect herd-mates. This animal ingested a piece of wire, causing its death.

► **Right:** This photograph of an esophagus where it transitions from deep red to pale tan is an indication of an animal death due to bloat.

PHOTOS COURTESY OF TOM BALDWIN



► **Left:** A necropsy of a calf revealed thyroid hyperplasia indicating iodine deficiency.



Baldwin says. If the producer shares what therapy the animal was given, the necropsy team members would know firsthand what they are dealing with.

Clues from within

The postmortem examination begins by a pathologist examining all organs to identify those that appear abnormal.

"The pathologist conducts a very thorough postmortem examination where he will examine each of the major organ systems carefully and dissect those out. Then he'll see if he can see anything with just the unaided eye that might tell why this animal has passed on," Baldwin says. "At the same time, he'll take samples needed for ancillary laboratory tests and preserve or store them to halt the postmortem breakdown."

Baldwin says a pathologist is responsible for taking tissues and "trimming them in," which is the process of preparing them for viewing under the microscope.

A histopathology examination is performed on each tissue under the microscope to see if there are any pathologic processes evident that provide any clues as to

what was happening to the animal, Baldwin says.

"Pathologists are also responsible then to submit tissues, fluids, fecal material or whatever it might be to other labs for culture, isolation, amplification, mineral analysis or whatever is needed to establish a diagnosis," he says.

If it's suspected that the animal has an intestine infection, for example, Baldwin says he would ligate a loop of the intestine and send it to the bacteriology laboratory for testing. He would also harvest a piece of the spleen to send to the molecular section of the laboratory to be screened for bovine viral diarrhea (BVD) virus. Fecal material may be saved in an appropriate container and held back for virus screens down the road if answers aren't provided from initial testing.

Other specialists commonly involved in further analysis of samples provided by the pathologist include a virologist who looks at suspect virus samples, a bacteriologist who looks at suspect bacterial infections, a molecular diagnostician who would use special techniques to identify a virus or bacteria, and a toxicologist who would be

involved if a chemical or nutritional problem is suspected.

Hall's specialty is toxicology. He recently was put on a case where the pathologist recognized lesions. The lesions indicated a few areas of concern, and one was a mineral deficiency.

"[The pathologist] took a section of the liver, froze it back and gave it to me. In the toxicology lab, I do all the analytical chemistry," Hall says. "I took a section of that liver, digested it (a lab technique used to break down the substance) and ran it through a plasma instrument to measure the amount of copper in the liver. I was able to tell him the copper concentration was normal. There's lots of little pieces and parts that go together to paint the whole picture for what the necropsy will tell you."

Cost of benefits

"Any time you raise livestock you are going to lose an animal occasionally," Hall says. "No matter if you are the best producer in the world, it's still going to happen."

So when should producers consider paying for a necropsy?

"I argue that they should look at younger animals — calves — more carefully than perhaps the older ones because the potential is greater for infectious disease to go through their calf pens than it is their mature animals," Baldwin says.

He also encourages producers to consider having a necropsy in the case of an abortion, or spontaneous loss of a calf from a cow. Many times abortions are caused by infectious agents, he continues. If they go undiagnosed, producers could experience what's called an abortion storm, where large numbers of pregnant cows abort their fetuses, which is very costly.

Hall says it's a good idea to have a necropsy performed when you haven't got a clue what's going on. "If I lose one calf, do I want to spend \$50 or \$100 to take it in and have someone tell me why it died? If it is something that could affect the rest of the group, it's important to know because you can try to mitigate and stop the losses at that point," he continues. "If it turns out it's some type of a genetic defect that's not going to affect the rest of the animals, then you've just spent \$100 for peace of mind to know it's not something that's going to affect the rest of the animals."

Baldwin says on a national level, most cattle necropsies will cost between \$60 and \$100. Smaller calves and other small livestock are less expensive, generally around

Consider your social responsibility

In today's environment we have to think about the possibility of foreign animal diseases, says Tom Baldwin, a veterinary pathologist and director of the Utah State University (USU) Utah Veterinary Diagnostic Laboratory.

"I've had producers bring in cows with no heads," Baldwin says, because they are afraid further testing will result in identifying bovine spongiform encephalopathy (BSE).

"If they have a concern about a foreign animal disease or if that's a possibility, it's imperative that we get that animal. To not [bring the animal in] brings up all sorts of issues, some of which would be criminal," he says.

Baldwin says his lab is very hesitant to accept a cow without its head for more than one concern. "If the condition is neurologic, I've been crippled. I can't tell them because they didn't let me have the brain to look at," he says.

\$50. When renderers are charging anywhere from \$50 to \$150 to pick up dead animals — if the service is even available — a necropsy is a bargain, Baldwin says. “We do a necropsy for \$80 on huge cows. That includes the postmortem, the disposal, the histopathology, the bacteriology, the virology, any immunohistochemistry that has to be done or molecular diagnostics. It’s the best bargain in the world.”

Get effective results

There are certain death losses, like those undiscovered for a few days, which are not good candidates for postmortem analysis. “One of the greatest enemies of diagnostic work is postmortem breakdown,” Baldwin says.

“It is time- and temperature-dependent,” Hall says. “If you are dealing with environmental temperatures, say middle of the summer, once you get past 24 hours most of the tissues are degraded to the point that looking at them under the microscope may not tell you anything.” However, within the 12- to 24-hour period after death, you are starting to lose some of the tissue architecture, but yet you may still be able to see what’s going on.

Baldwin says, for example, BVD is incredibly susceptible to postmortem breakdown. “We may fail to isolate or identify the virus, not because it wasn’t there, just because it broke down in the tissues before we got the body,” he says. “If the animal is still in rigor, we are still in good shape. Once the animal goes out of rigor, things are going downhill rapidly.”

Hall and Baldwin agree that animals treated with extensive drug therapy are also unlikely cases for scientists to be able to find solid answers.

“If you have two or three animals die in a similar time period and you only want to get one of them done, get the one done that’s the freshest and has had no treatment,” Hall says. “Once they have been treated with a variety of antibiotics, the organism may still be in the tissues, but it may be difficult to grow. And if you can’t grow it, you can’t identify it.”

While there isn’t a bright side to an animal death loss, producers should take advantage of the management information that may be gained from a necropsy of the animal, Baldwin says. “The more forward and the more progressive the producers are, the more animals they submit for postmortem exam.”

