

PM Case Discussion – Roan Heifer



This case discussion about a roan heifer is to show you how much information you could get out of a Post-Mortem examination (when done thoroughly and soon after death). Finding out why an animal has died, helps you to take appropriate management/preventative measures and thus maintain herd health and to optimize your animal production.

We provide you the history of the animal, some PM photos, and then follow up with our interpretation of the findings leading to a diagnosis of the cause of death of the animal as well as management advise.

History

Species: Roan
Sex: Heifer
Age: 6-8 months

This case takes place during the severe drought of 2019, which also hit this farm hard. All animals on the farm received supplemental feeding, consisting of lucerne and boskos. They had access to a phosphate lick which contained a little bit of urea.

This roan heifer was acutely and severely ill - we were called out to examine and treat her. In the days before this roan got sick, two other roan cows died following an acute illness. No post-mortems were done on these, but according to the farm workers they were bloated. Upon our arrival on the farm (2 hours after receiving the call out), the roan heifer just died.

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The Post-Mortem

Below we give you with our observations and photos. Try to use this information to see if you can come up with a list of possible causes of death.

External Examination of the carcass before conducting the PM



Figure 1 The roan heifer was in a poor body condition and bloated

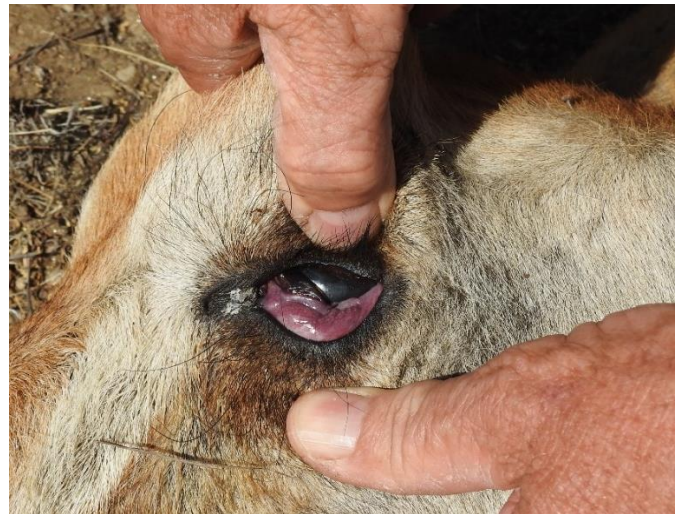


Figure 2 The mucous membranes were of a purple-bluish colour (cyanotic)

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Internal examination

Upon opening of the carcass, we found bleedings (haemorrhages) on the rumen wall (Figure 4). The question is, did the bloating (and subsequent bleedings on the rumen wall) happen before, or after the roan died?



Figure 3 Overview of the chest- and abdominal areas



Figure 4 Small bleedings on the rumen

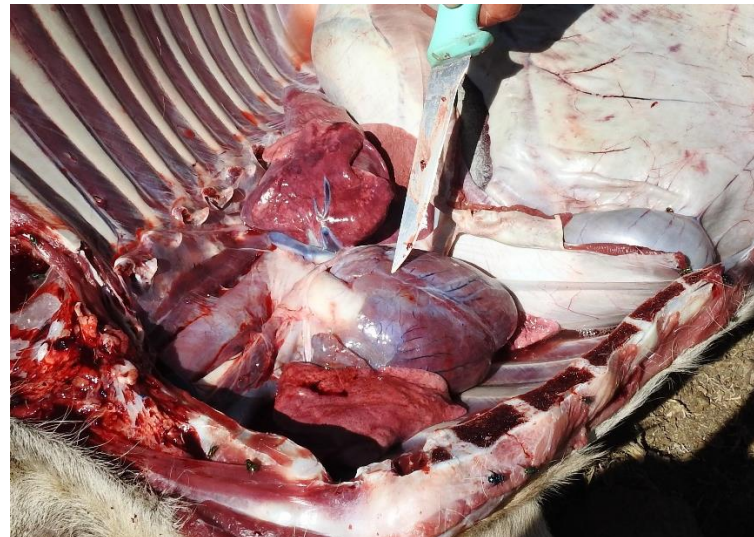


Figure 5 No fat was observed around the heart groove

There was no fat around the coronary groove (groove that separates the atria and ventricles) around the heart, and also no fat on the omentum ((thin membrane that covers the stomachs and intestines) nor around the kidneys (Figure 5, Figure 6). What does this imply?

The heart was otherwise normal. The lungs and liver appeared to be normal. The spleen was contracted.



Figure 6 No fat around the omentum

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The fore-stomachs showed some interesting findings. First of all, the rumen was very full, and the contents were dry and impacted (Figure 7).

The next stomach, the reticulum, was completely empty (Figure 8, Figure 9), which was strange, considering that the following compartment, the omasum and abomasum, were impacted with dry content.

The duodenum (first part of the small intestines) was completely empty, indicating that no food was passing through from the abomasum.



Figure 7 The rumen was full, and its content impacted

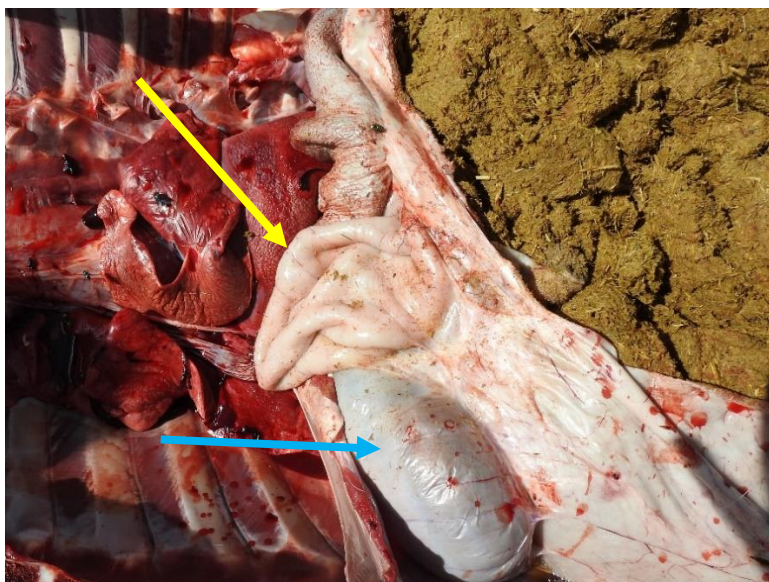


Figure 8 The reticulum (yellow arrow) as seen from the outside, looking empty. The blue arrow indicates the omasum.



Figure 9 The reticulum seen from the inside; it was indeed completely empty

Lastly, we found that the pyloric sphincter was thickened, and its opening was therefore narrowed (Figure 10). The pyloric sphincter can be found at the transition of the (abomasum) stomach and intestine. It is a muscle that controls the movement of partially digested food and juices from the stomach into the duodenum. This pyloric sphincter thickening is not easy to identify and requires a person to be well experienced in doing PM's.



Figure 10 The pyloric sphincter

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Post-Mortem findings

Which facts have been remarkable to you in this case? Important findings were:

- Purple/bluish mucous membranes
- Carcass was bloated, bleedings on the rumen wall
- Poor body condition (not fat anywhere) in spite of the rumen being completely full
- The reticulum was empty, omasum and abomasum full, but the duodenum (small intestine) completely empty.

Mucous membranes

The mucous membranes should be pink and moist. In this case, the mucous membranes were purple/bluish, indicating a lack of oxygen (cyanosis). The blue colouration is caused by pooling of oxygen deprived blood in the capillaries. This is a sign of a serious oxygen deficiency which is most commonly caused by primary lung pathology or suffocation (obstruction of the airways – snare, foreign body; external pressure on the lungs – collapsed lungs due to fluid/air accumulation in the chest cavity; abdominal organs pressing on the diaphragm severely interfering with breathing etc.)

The airways were open and lungs appeared normal - cyanotic mucous membranes were likely caused by suffocation due to rumen bloat and pressure on the diaphragm.

Body condition

The roan was in a poor body condition, as we could see on the external examination. The internal examination confirmed this; there was no fat around the organs. We specifically check the around the heart, omentum and kidneys. These organs should at least have some fat around them. In this case, the body resorbed all the body fat to sustain life because it did not get enough nutrients in to sustain growth and normal body function anymore.

The fact that the rumen was completely full of food suggests that the animal had a good appetite till shortly before death BUT that the caloric content of the food was not enough to maintain body condition. Infectious disease etc were considered unlikely since these usually result in a reduced appetite.

Bloat

The roan was bloated. With bloat, the question is always; did the animal die because of bloat, or did the carcass bloat up after death? In this case, the bleedings on the rumen give us an important clue. Remember... dead animals don't bleed. The bleedings on the rumen wall (small blood vessels tearing in the rumen wall as this stretches beyond normal size) must have happened before death. If the carcass would have bloated after death, we would not have found these bleedings.

Empty reticulum and impacted omasum and abomasum

The rumen as well as omasum and abomasum content were very dry (likely due to dehydration) and seemed very rich in hard fibre. The likelihood of a simple mechanical obstruction due to an excessively high and undigestible fibre content are high.

Spleen

The spleen was contracted, this could have been a sign of shock. When doing a Post-Mortem, it is always important to take a sample of the spleen. The spleen is a very important organ with many functions.

Suspected cause of death

The absence of fat around the heart, omentum and kidneys indicate that the roan was starving. Her rumen was completely full and impacted, but the food did not pass through, mostly due to excess undigestible fibre in the food and partially due to a thickened pyloric sphincter (as a result of excessive undigestible dietary fibre?).

The fact that the rumen was so full and dry, suggests poor digestibility of the food. We believe that the lignin content of the “home made” boskos was too high. This can happen when boskos is cut at a late stage of the season, when there is no green left around the branches and where, as was the case here, the for boskos suitable bush has been over-harvested with farmers/workers in desperation using too thick woody branches. This makes the boskos of inferior quality, which cannot, or only partially, be digested.

The roan could not adequately digest the food, resulting in starvation, eventual forestomach impaction, bloat and death by suffocation.

Advice for farmers

In this case, the farmer was advised to take away the boskos, or at least drastically reduce the amount of boskos fed, and feed more, good-quality hay and lucerne, game pellets, supplemented with a little bit of maize. Provide a lick formulated for ruminants but beware of a urea toxicity where both a urea containing lick and supplemental pellets are fed.

Rumen microorganisms are the little guys who actually do the hard work of digesting roughage fibre for their ruminant host and in the process produce most vitamins needed. These microorganisms eventually pass through the digestive system, where they themselves are digested to provide a ruminant with a rich source of proteins they need to produce muscle, milk etc. Considering their vital role in ruminant nutrition and survival, it should be obvious that any diet and especially dietary changes should consider the wellbeing of these organisms. A ruminant with a good and healthy population of these rumen microorganisms is a healthy ruminant.

Any dietary changes (e.g., from “home-made” Boskos to a commercial pelleted food containing maize and urea) must be made gradually to allow these organisms to adapt to their new environment. Ideally introduce the new diet by say 10% daily increments while cutting down the old diet in similar proportions – a changeover over 10-14 days is advisable. Failing to do this can cause severe and fatal complications and diseases e.g., redgut (rooiderm) and pulpy kidney (bloednier).

For more dietary advice we recommend you to contact Craig Shepstone, an animal nutritionist from South-Africa who has a lot of experience with wildlife (craig.shepstone@gmail.com, +27 83 305 1380)