

Elementary! My Dear Watson

I have always liked a good whodunit and both the new American and British takes on Sherlock Holmes have whetted my appetite. As shepherds we have to uncover mysteries in our flocks on a regular basis. We have to notice evidence, search for clues, establish theories, research and find solutions and have “justice” when we are right and discouragement when we are wrong and must go back to the drawing board.

Some of the most difficult of these mysteries are nutritionally based health problems. I am not talking about the common nutritional diseases such as calcium imbalance at lambing, white muscle disease caused by selenium deficiency or even copper toxicity. I am talking about rarely (thankfully) encountered conditions that are difficult to diagnose, especially for those that have never encountered them before.

The following are two “cases” that I have encountered over the last year. One was solved with an acceptable outcome, the second is still in the research stage though we are gathering a weight of evidence. As a complicating factor, this area is predominately dairy operations. Therefore the large animal vets in this area specialize in dairy cattle and most have little if any experience in small ruminants. That leaves me with less than stellar support and often solving problems on my own.

Case 1 Thiamine deficiency Polioencephalomalacia

This started off very quietly with a lamb that was scouring. I figured low grade coccidiosis and treated her. We get occasional mild cases every year ... no biggy. Then she was moved to another pasture, again with scours. When I went to treat her, she went down on her knees and arched her neck. Strange but I wasn't too concerned. Then I noticed a second lamb quiet, by himself and not too energetic and seeming to have problems rising. They were close to weaning age so I brought both inside. There was staggering in one and the second was flat out and could not rise within 24 hours. Was there a toxic plant in the pasture that caused it? There was lots of milkweed in there and they had been eating it. I drenched them both with activated charcoal just in case they had eaten a toxic plant. They were going downhill fast. I called in the vet but at the same time I asked Bob to get the gun. The vet asked whether I had given NuCells (a vitamin mineral supplement). He said it was hepatoencephalo inflammation caused by a toxin. His prescription was injections of prednisone, New Cells (a vitamin/mineral supplement), trimethoprim sulfa and to keep the lamb hydrated. If that doesn't work, put the lamb down.

His diagnosis got me thinking about a nutritional disease and I started in my vet books and the internet. Bingo – polioencephalomalacia (polio) which can be caused by thiamine deficiency. (That diagnosis was confirmed by the sheep specialist in Guelph after the fact.) Treatment was high doses of thiamine 3 times a day. I also used the New Cells and prednisone to reduce the brain inflammation but only used the trimethoprim sulfa once. Both lambs recovered though the first lamb continued very slow growth and was the smallest lamb after 8 months. The vet's diagnosis and treatment were off target

and I doubt the lambs would have survived without the added thiamine. However, it got me researching in the right direction. My remaining question is what triggered the condition on two lambs though we had 36 lamb in the field. None of the potential triggers for polio were obviously present. More on this later.

Case 2 Serious fertility problems with our Tunis ewes

Like all of you I love my Tunis both for their thriftiness and mostly for the quality of their meat. We started with 3 Tunis ewes about 6 years ago. Over time more and more of our Tunis ewes failed to lamb until last year 3 out of 5 did not catch and this year 4 out of 5 were rebred. We also raise North Country Cheviots and Cheviot/Tunis crossbreds. All of them lambed. We had a serious problem and were considering getting rid of our beloved Tunis.

We then started to put together some other problems we had in our flock.

- A few of the Cheviot ewes had lost the crimp in their wool and had poor wool regrowth especially around the back end, chest and neck.
- A yearling ewe that was three quarters Tunis broke her leg. Accidents happen. Right?
- We are very diligent about pasture management and working to control parasites but parasites continued to be a problem.
- We monitor our growth rates through the national production testing program in Canada. We were seeing a year over year slow decline in growth up to 50 days.
- We had lower than expected growth in some of our lambs especially from older ewes.
- I felt the coat colour in our Tunis was fading faster than I would expect from age alone.

These are all small things individually but put together I felt we had a major problem. So, I went back to our books and the internet. The evidence was pointing to copper deficiency. Now say that to any shepherd and vet in this country and they tell you that you are nuts and if you give copper to your sheep you will kill them. Yes, the margin of safety between required levels of copper and toxic levels in sheep is very narrow. But they do need some copper which for the most part is supplied by diet alone.

We have had our hay analysed including micronutrients. When we compared the analysis with the Cornell sheep nutrition program it showed that we were low on copper, cobalt, iodine, selenium and zinc, marginally high on molybdenum and had huge levels of iron. We use a sheep mineral that supplies the cobalt, iodine, selenium and zinc but not copper. And what was the effect of the molybdenum and iron? We also have high iron and sulphur in our water. What is the effect of those?

I contacted a sheep research vet at the Ontario Veterinary College in Guelph. She said copper deficiency was possible but that our hay was fine. She recommended we have blood and preferably liver samples analysed. Our local vet was not convinced there was a problem and suggested I might want to get rid of our Tunis.

We had blood drawn on two of our rams: one Tunis and the other a Hamp/Cheviot cross. The Tunis sample came back below normal for copper and the crossbred was low normal. Again, the research vet said it was inconclusive and we needed liver samples.

We had slaughtered the three ewes that did not lamb last summer so we sent out liver samples from two of them. Unfortunately, the butcher did not track the livers so we were unsure which liver came from which ewe. Two of the samples were from our original Tunis ewes and the third was from a yearling ewe that was three quarters Tunis. One of the samples came back as very low normal and the other was in the normal range for copper. Cobalt, selenium, zinc and iron were all in the normal range BUT molybdenum was twice the maximum normal level. Finally, the local vet started to pay attention.

It is too complicated to explain in an article like this but a combination of high molybdenum and sulphur form a compound called thiomolybdate which binds copper and makes it unavailable. There is very good information on this problem on the internet especially coming out of Europe and New Zealand. High iron levels also reduce copper availability. Even with normal blood levels of copper you can show signs of copper deficiency because of interference from the other metals. The interaction chart of different dietary elements is hugely complicated and well beyond this shepherd's knowledge base. This is one area for professional advice.

I said that I would get back to the polio case later in the article. I just read that copper deficiency can cause an increased incidence in polio. Maybe my two cases are actually one.

We still have a lot of testing to do: our water, grain, hay and potentially more livers to confirm the diagnosis. I am working with a company in the UK (Telsol) that make slow release boluses of copper, selenium and cobalt. I also am working with our local vet and the research vet at the Ontario Veterinary College.

When I quoted "Elementary My dear Watson" little did I know that one of those elements would be copper. We still have a long way to go to find a solution but I am hoping that solution will include Tunis sheep remaining at Hawk Hill Farm. I will write when we have an actual end to this story.

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