DAIRY HERD HEALTH & PRODUCTIVITY SERVICE

Newsletter 2024, Q3 Aug 2024

We are recruiting for a DHHPS vet

If you are an enthusiastic farm animal vet that is motivated and a team player, please call the office to speak to one of the team. Or go to www.ed.ac.uk/jobs Position Ref: 10834 Closing date 9th August 2024.

Low blood and milk urea levels in cows at grass – how is this possible?!?

You do not need us to tell you that it has been a tough spring all round. Cold. Wet. Poor grass growth. Waterlogged fields. Both cows and people have struggled, and it will not surprise most observers that the spring peak milk production was later and lower in 2024 compared to previous years. Indeed, AHDB Dairy figures show that GB milk production in April 2024 was down nearly 2% compared to the previous years.

One of the interesting side-effects of the cold wet spring that we have seen through the DHHPS is the number of metabolic profile blood tests with low blood urea-N results in milking cows at grass. On first appearances, this might appear a contradiction! Grazed grass is usually high in protein (especially Effective Rumen Degradable Protein: ERDP), and urea (or urea-N) is regarded as a measure of intakes of ERDP. So cows at grass usually have high blood (and milk) urea levels.

However, the actual situation is more nuanced. Urea levels are a measure not only of A) the ERDP content of the diet, but also B) short-term intakes of ERDP, as well as C) the rate of ERDP utilization in the rumen (i.e. the balance of energy and protein supplied to the rumen microbes). Therefore, if grazing intakes are poor because grass is in short supply or very wet, then urea levels will be lower. Likewise, if the energy and protein supplied to the rumen is finely balanced, all of the available ERDP (ammonia and ammino acids) is converted into microbial protein in the rumen, and so blood urea levels drop. Older readers may remember this situation previously termed “diet synchrony”.

What does this mean practically? In dairy herds out at grass with low blood urea (urea-N below 1.7 mmol/l; urea below 3.6 mmol/l) or milk urea levels below 0.020%, supplementation with more protein is **un**likely to be cost-effective. It is likely that these low urea results are a reflection of poor Dry Matter intakes, or the balance of sugar and protein in the spring grass. Note that there have been no links made between **low** urea levels and fertility in dairy cows.

Cows are relatively inefficient at utilizing dietary nitrogen (mostly eaten via protein), and approximately 30% of the dietary nitrogen that a cow eats will be utilized to make protein for milk production, maintenance, growth or pregnancy. Given that feeding protein is one of the major variable costs, and a number of countries are putting pressure on livestock producers to reduce excessive nitrogen excretion, improving nitrogen (i.e. protein) use efficiency in dairy cows has both economic and environmental benefits. This is the driver behind the general trend to lower the Crude Protein content in dairy cow diets. This is not possible in cows out at pasture!

A recent Irish study (Tavernier at al., 2023, JDS 106, 8871-8884) sought to assess the main factors involved in nitrogen utilization in grazing cattle. Although there are several limitations to these calculations in grazing cows (measurement of nitrogen in and nitrogen out is difficult!), there are some interesting results from this work. Overall nitrogen utilization was poorer in grazing cows on higher protein diets (around 20%), and was lower in late lactation cows with lower milk yields. Milk urea nitrogen was poorly correlated with nitrogen use efficiency, and so further work is needed before milk (or blood) urea can be used for assessment in dairy herds.

DHHPS at UK Dairy Day

We will have a stand in the Sharing Knowledge Space at UK Dairy Day on the 11th September at Telford, Shropshire. Pop along and see us if you are coming to the day.

First Aid for Feet Course

We are organising a "First Aid for Feet" practical foot trimming course on Wednesday 4th September at Langhill Farm, Roslin, Midlothian. To register, please contact the DHHPS office.

New perspectives on Johne's Disease control in dairy herds

Johne's Disease remains a significant cause of economic loss on many UK dairy farms. Not only are there costs associated with clinical cases (wasting cows with diarrhoea and reduced milk production), but subclinical cases may result in high somatic cell counts and an increased risk of being culled prematurely from the herd.

Johne's Disease remains a difficult disease to control. The majority of infections are considered to occur in young calves (within the first month of life), with a long incubation period before clinical signs occur, most commonly at 3 – 5 years of age. When a clinical case occurs, you are dealing with the consequences of an infection that occurred many years previously.

It is considered that there are three potential routes of infection from the mother to the newborn calf:

- Contaminated colostrum/milk
- *In utero* infection, where infection crosses the placenta to the calf prior to birth
- Environmental contamination, where the calf suckles dirty teats or gets infection from contaminated bedding material.

A recent study (Nunney et al., 2023 Prev Vet Med 219: 106022) followed 439 calves in 6 UK dairy herds for up to eleven years to see what the main factors resulting in calf infection were. Calves born from Johne's Disease infected mothers had a higher risk of being infected, even after excluding potential transmission via colostrum. However, one of the biggest risk factors appears to be those calves that remained for prolonged periods (over 7 hours) in a dirty calving area. Even calves that were unlikely to have been infected via colostrum (for example because they received artificial colostrum) had a higher risk of becoming infected with Johne's Disease if they stayed for prolonged periods in a dirty calving environment, illustrating the key role that environmental contamination at birth plays in the transmission of Johne's Disease.

Another issue complicating control is that the bovine tuberculosis (bTB) skin test can interfere with the Johne's Disease antibody test (either in milk or in blood). This is not unexpected: both conditions are caused by Mycobacteria, and the full name of the Johne's Disease-causing bacteria (*Mycobacterium avium* ssp. *paratuberculosis*: usually abbreviated to *Map*) illustrates how the use of *Mycobacterium avium* purified protein derivative in the comparative bTB skin test might interfere with *Map* antibody tests.

Recent published research using NMR Johne's Disease milk antibody test results has looked at this further (Nunney et al., 2022 JDS 105: 8354-8363). In cows that were classified as "infected" (J5 cows with multiple positive results), the Johne's Disease milk antibody test results were immediately increased after the bTB skin test, resulting in an increased likelihood that the animal would test positive. The theory is that the bTB skin test boosts the immune response to the *Map* resulting in the increased production of antibodies, picked up in the blood or milk test.

However for "non-infected" cows, there was also an increase in the Johne's Disease milk antibody test results – although this was delayed until 2-4 weeks after the bTB skin test. This unfortunately increases the likelihood of "false positive" test results in non-infected cows.

Overall the current recommendations remain unchanged. The bTB skin test does affect the Johne's Disease milk and blood antibody test results, and you should ideally leave a minimum interval of 42 days (milk test) and 90 days (blood test) between the bTB skin test and Johne's Disease testing.

RoMS mobility scoring course

We are running a RoMS accredited dairy cow mobility scoring course on Tuesday 27th August at Langhill Farm, Roslin, Midlothian. To register, please contact the DHHPS office.