

Automated monitoring systems are ubiquitous on modern dairy farms. Physically these systems use ID tags on ears or necks that monitor walking, and rumination activity in real time. The herd management software then transforms this data into action reports that identify cows at risk of health events including heat, calving, ketosis, indigestion and mastitis. Although the algorithm that generates these reports is different for each system, each system reliably identifies cows that require extra attention with the intention that early intervention will reduce the severity or duration of clinical disease.

In the past year there has been a series of articles that have investigated the association between rumination time and clinical disease around calving. In two separate articles researchers from Cornell and Minnesota have shown a significant reduction in rumination times in the 7 days before diagnosis of mastitis, metritis, and metabolic diseases including indigestion and displaced abomasum.

More recently Santos et al (2024) tracked rumination time from 21 days before expected calving date to 15 days after calving. Put simply a 53 minute per day reduction in rumination time in second lactation or older cows was associated with a 3.7 times greater risk of postpartum disease, a lower odd of pregnancy by 210 days in milk, a higher risk of culling and 2 liters less milk per day over the lactation.

Clearly rumination time matters, so what is rumination, why does rumination time vary between cows and how can we manage it to improve transition cow health and production?

Rumination is the process of regurgitation of fibrous ingesta to allow the cow to break it down into smaller pieces that can then leave the rumen and continue digestion in the lower intestinal tract. Through the process of chewing the cow adds bicarbonate rich saliva to the rumen that serves as a buffer to prevent ruminal acidosis. Rumination time is proportionate to ration characteristic including crude protein, starch and fibre. At the herd level, rumination time could be used to monitor the effects of intentional or accidental nutritional changes in the herd.

An average rumination time in dairy cows without disease and stress was estimated to be 463 min/d in primiparous and 522 min/d in pluriparous cows (Soriani et al. 2012 ). Cows can ruminate while standing, but preferably ruminate lying down. Considering the entire time spent ruminating, cows ruminate when lying down 63.4% of the time and only 36.5% of the time in standing position. However, these patterns can be altered by environmental conditions, and, during summer, cows ruminate in the standing position more often (56% of the time; Acatincai et al. 2010).

Rumination is voluntarily controlled by the animal. This means that any event that result in pain, hunger, maternal anxiety or illness can alter rumination time. Maternal distress in the 4-8 hours before calving will result in a dramatic reduction in rumination time. After calving, rumination in healthy cows increased rapidly to a peak on 8 days in milk and plateaued off, whereas the peak in rumination in diseased cows was delayed to 15 days before leveling off.

Managing the dry cow to limit stress is paramount. This means reducing milk production prior to dry off so that the udder does not over fill in the days immediate after drying off. The National Mastitis Council recommends production under 15 L per day at dry off and the use of an internal teat sealant to facilitate the formation of the keratin plug and limit the risk of new intramammary infection.

Next provide sufficient space for each cow. Social conflict will reduce feeding behaviour and rumination time. An aspirational goal for dry cow management is to establish dry cow cohorts that spend the entire dry period together in a stable group. As a minimal goal limit changes in the cows social group during the last week prior to calving. Further maintaining a stocking density between 80% and 100% will permit optimal lying time. This means one stall per cow or a minimum of 10 square metres (100 square feet) of bedded pack. Finally, at least 76 cm (30 inches) of bunk space to limit feed bunk aggression.

Providing sufficient cooling of dry cows will also improve rumination time. Temperatures beyond 27–28 °C reduce the overall rumination process, including both frequency and duration of this activity. More interestingly, heat stress reduced the rumination time by 22.9% even in dry dairy cows leading to impaired the ruminal degradability of the consumed feed (Maia et al. [2020](#)). The current benchmark to provide cooling is air speed of 1-2 meters per second at 50 cm above the laying surface of the cow.

Cows fed a DCAD diet during the dry period ruminated 86 min longer than control cows. This nutritional prevention of milk fever will improve rumination time. A recent study by Goff et al. (2020) observed that cows with normal calcium levels spent more time ruminating after calving than subclinical hypocalcemia or cows with clinical signs of milk fever. They also observed that cows fed DCAD diet during dry period ruminated 86 min longer than control cows which emphasizes that dry cow management has long-term impact in the post-partum cows.

When a cow is experiencing an illness event managing pain will help mitigate the negative impact on rumination time. In mastitis challenge studies treatment with a non steroidal anti-inflammatory has improved rumination time.

On farm data is accumulating at an astronomical rate. Response in rumination time may have prognostic value in assessing the effectiveness of the applied treatment and assist in determining when to stop treatment. Furthermore there is an opportunity to monitor rumination time in pens and individuals to assess ration changes and the well being and future health of the dry group or individual dry cows.