Time for Technology

Calving and Cud Chewing are Highly Correlated

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In the day to day management of a dairy herd, predicting the time of calving is a task that comes with some definite challenges. Every pregnant cow has a projected calving date, usually calculated as 283 days after the last breeding date, and with a little luck, it will happen somewhere within 10 days before and 10 days after this "due date". I recall an old recommendation that dairy farms should have one calving pen for every 20 cows in the herd, and if you have this luxury on your farm, you have the space to put cows in the calving pen for up to 20 days and cover off this entire period. But few farms have this much maternity space, and few would want the work of caring for cows in individual pens for that length of time.

There are a few ways to increase the accuracy of predicted gestation length. If the cow is younger, the birth will likely happen a little sooner, or if an ultrasound pregnancy diagnosis has told us this is a bull calf, the pregnancy will likely last an average of two days longer. If the sire of the fetus is a calving ease bull, there is a good chance of an early calving because a combination of this trait and size of the calf at birth determine the calving ease rating. Gestation length, especially the fetal component determined by the sire of the calf is quite highly heritable and quite easy to measure in the population. If predicting the date of calving is a useful management exercise, perhaps we should collect gestation length data on AI sires and adjust predicted calving dates according to service sire. But even with all the correction factors we can dream up, predicting the time of calving from gestation length will always remain a highly inaccurate process. At best we can only hope to predict calving within a 10 to 14 day window. New Zealanders have looked at scoring "udder fill" but that has proven to be a discouraging exercise as well. Of course, once the pins drop and the feet are sticking out, we all get good at predicting that calving is a few hours away, but these obvious signs will only help us if we are in the barn to see them.

Based on the number of calves that are born in the dry cow pen, and on the consequences this can have on the health of the calf and of the cow, it is clear that many farmers would benefit from accurate tools to predict when a cow should go in the calving pen. Based on a recent report at the Precision Dairy Management Conference, a decline in cud chewing appears to be a highly accurate signal that calving is a few days away. Cud chewing or rumination is being measured in cows in both research farms and commercial herds with a neck mounted device

called a "vocaltag" that combines activity monitoring and measurement of the sounds made by the cow as she chews her cud. If you are so inclined, you can hear the sound of a cow chewing her cud on the website www.vocaltag.com . The research version of this tag not only defines chewing time but also the speed and length of time each cud is chewed. As this technology becomes widely applied to nutrition research, we can expect it to help redefine our understanding of fibre and its role in the ration. The same technology has been further commercialized through incorporation into the Heatime neck tags used in commercial herds for heat detection. Both the inventor of this tag, Dr. Avi Bar Shalom and the chief engineer of distributor SCR, Dr. Doron Bar were among the scientists that attended the Precision Dairy Management Conference, and Dr. Doron Bar presented some very interesting data on the rumination behaviour of cows in Israel.
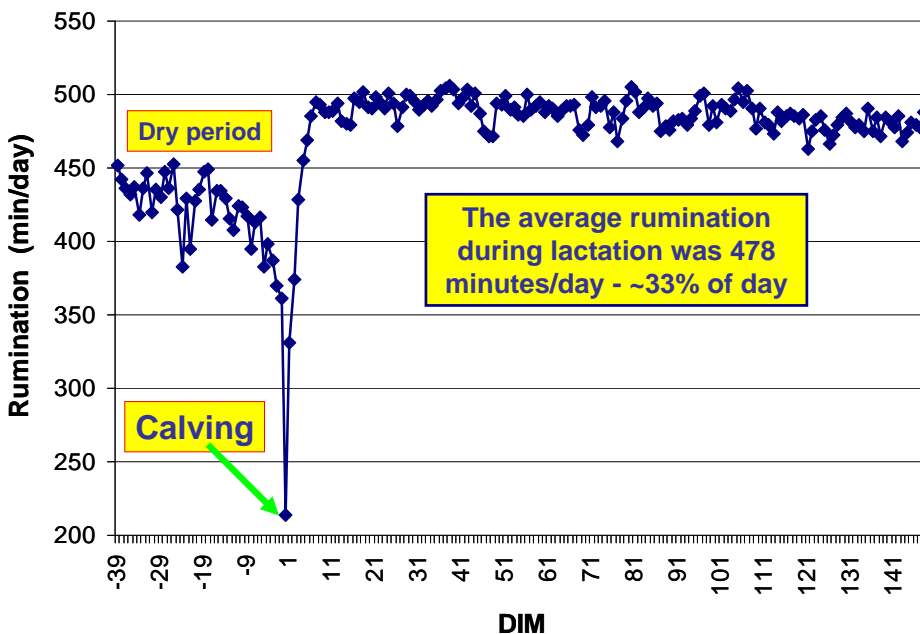
Dr. Bar recorded the rumination time of 75 cows in an Israeli herd through the dry period and the first 150 days of lactation. As illustrated in the graph, average rumination time for milking cows in this herd was 482 minutes per day. During the dry period, cows chewed their cud an average of 42 minutes per day less, and on the close up ration this declined to 66 minutes less per day than the milking cows. As shown on the graph, chewing time started going down quite dramatically the last week before calving. On the last five days, there was a daily decrease of about ten minutes each day, and on the day of calving rumination decreased from 350 minutes to 220 in a single day. Rumination on the day of calving was less than half of the typical time for a dry cow. Unfortunately, most commercial rumination tags are being read in milking parlors, in robotic milking stalls and in the breeding pen of the heifer barn. Heatime tags are normally purchased for activity monitoring for heat detection and even if cows in the dry pen have the

tags on, most herds do not have a tag reader in this pen. Dr. Bar's data suggests they may want to invest in one.

Disturbances to the normal pattern of rumination can also help identify changes in the milking cows. In another report at the conference, Dr. Maltz showed data on a fresh cow with ketosis and another with a DA that did not show the typical increase in chewing time found in the healthy cows shown on the graph. Dr. Bar also reported that cows in heat had a decreased rumination time of 75 minutes per day, and cows with clinical mastitis chewed 63 minutes less than normal. Heat stress and hoof trimming also reduced chewing time in this study. It would be expected that cows with metabolic problems such as rumen acidosis will also show altered chewing behaviour, and hopefully ration changes that reduce effective fibre will be identifiable from changes in chewing behaviour across the herd. As with many sensors used for monitoring, the benefits of rumination tags for the research herd make them very easy to justify in this application. Once we have more data from research applications, their potential in commercial herds will likely become clearer as well.