



Rumination Monitoring White Paper

Introduction

Rumination is a proven direct indicator of cow wellbeing and health. As such, dairy producers, veterinarians, and nutritionists alike have long relied on cud chewing as a key indicator of dairy cow health.

One of the primary purposes of rumination is to physically break down coarse material in food, in order to assist in its transfer from the rumen. An additional function is to increase the production of saliva, which acts as a buffer to the acids produced during the microbial degradation of carbohydrates. Dairy cows typically ruminate between 8-9 hours a day. A drop in rumination time can be a result of low feed intake or a direct disruption of rumen function.

Optimising herd health, fertility, nutrition, and general management is the key to farm profitability – and in all these areas rumination can contribute useful information. Rumination monitoring can provide an early window for disease diagnosis, assessment of recovery and treatment effectiveness, or diagnosis of feed related issues.

This document describes the advantages of rumination monitoring with SCR's management systems on the individual cow, group, and herd level.

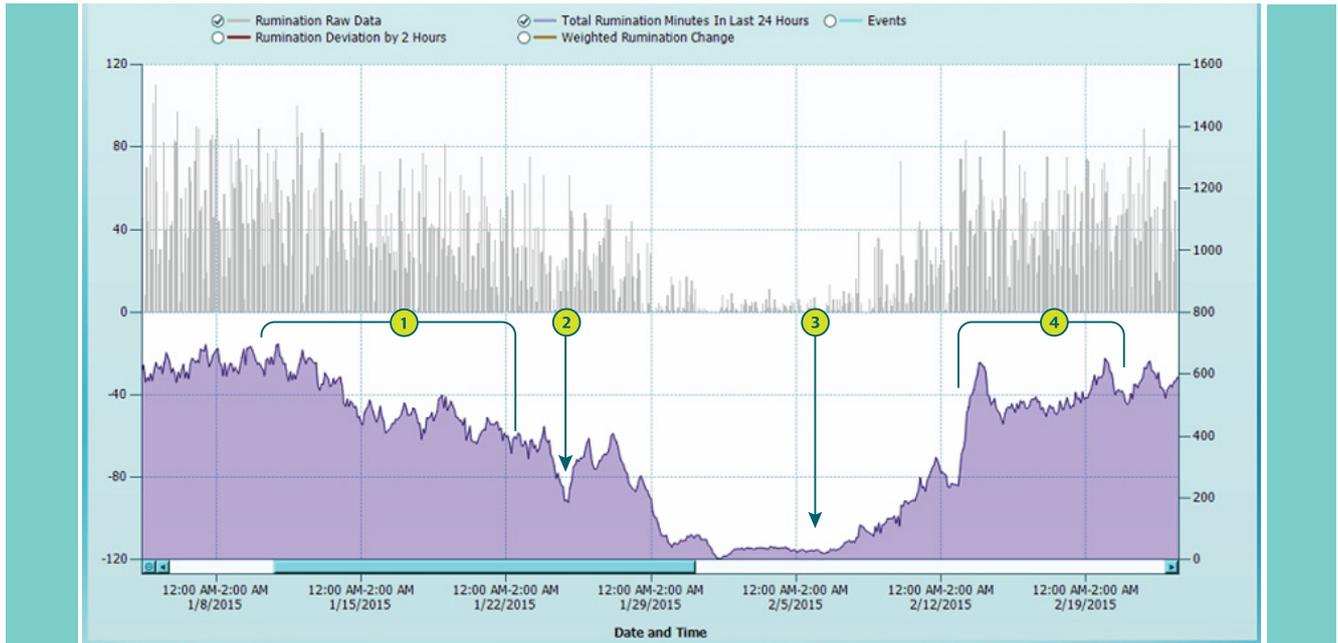


Health Monitoring Using Rumination Time

Early detection of disease:

Early detection and prompt treatment of sick cows can minimize the detrimental effects on their production, reproduction, and overall wellbeing. Research shows that using SCR's **Health Report** (that is based largely on rumination pattern analysis) enables the detection of disease days before it is apparent to the dairy farmer.

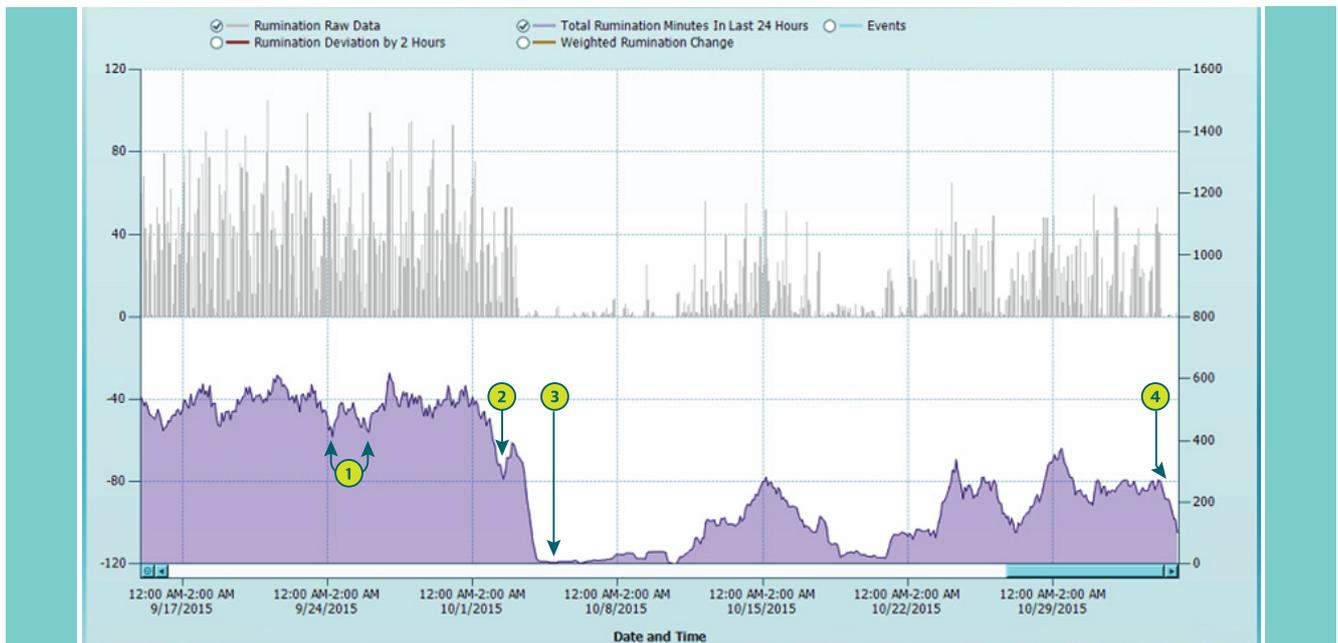
An example of a cow with mastitis is shown below. Rumination started to drop long before the farmer detected it in the milking shed.



- 1 Cow slowly starts dropping in rumination before milk yield drops
- 2 Cow diagnosed with clinical mastitis and treated with antibiotics
- 3 Cow starts recovering
- 4 Cow returns to normal levels of rumination

Easy to monitor recovery

Rumination is essential for the cow. As such, her rumination will return to normal levels before her production level returns to normal. This means that rumination monitoring provides a more immediate way to evaluate the effectiveness of treatment. An example of a cow with clinical mastitis is given below. After the cow was treated, rumination started rising. Notice how the recovery in this case is poor, indicated by the uneven and low level of rumination.

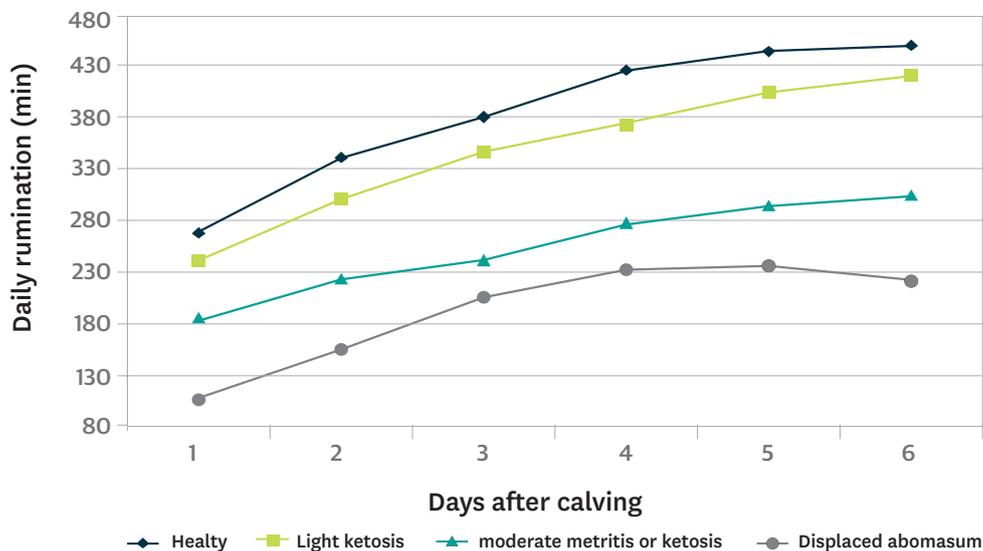


- 1 Cow appears in the Health report
- 2 Cow appears in the Health Report
- 3 Cow found recumbent; farmer treats cow for toxic clinical mastitis with antibiotics
- 4 Cow culled due to insufficient treatment

Post calving cow monitoring

The cow's wellbeing in the first days after calving dictates the fate of her health and productivity for the entire lactation. Cows with low feed intake in these critical days will suffer from various calving diseases (such as metritis and ketosis) later on, with a detrimental effect on future production and reproduction.

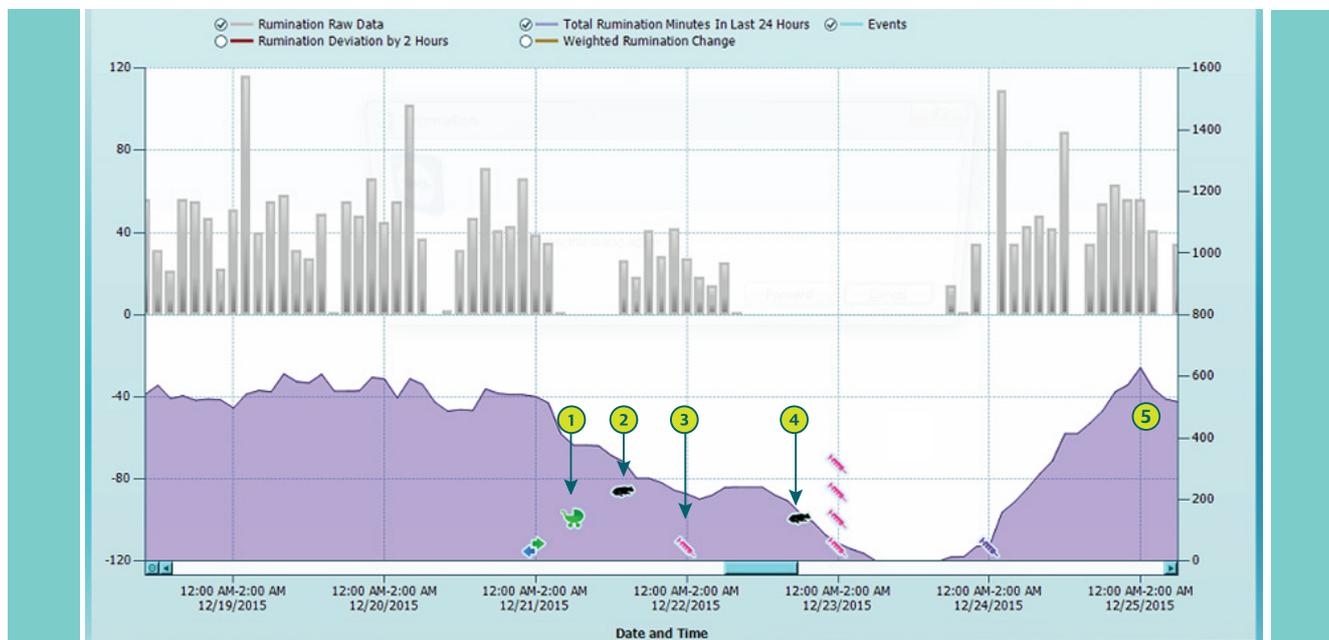
The next graph shows the daily rumination time of healthy and (later diagnosed) sick cows in the first week after calving. Cows with low rumination levels in this period appear on the SCR's Health Report, enabling the farmer to concentrate on these cows and properly respond before clinical diseases develop.



Real-time alerts in distress situations

Cows ruminate in numerous sessions throughout the day. A pause in rumination of a few hours is a rare situation. If a cow stops ruminating for a long period of time, she is probably suffering from an acute situation that requires the farmer to react immediately, before fatal consequences occur.

In order to protect the cow's wellbeing, SCR's system sends a distress alert to the farmer, as soon as distress occurs. The next figure shows the rumination pattern of a cow suffering from milk fever after calving, and the relevant alerts noted by the system.

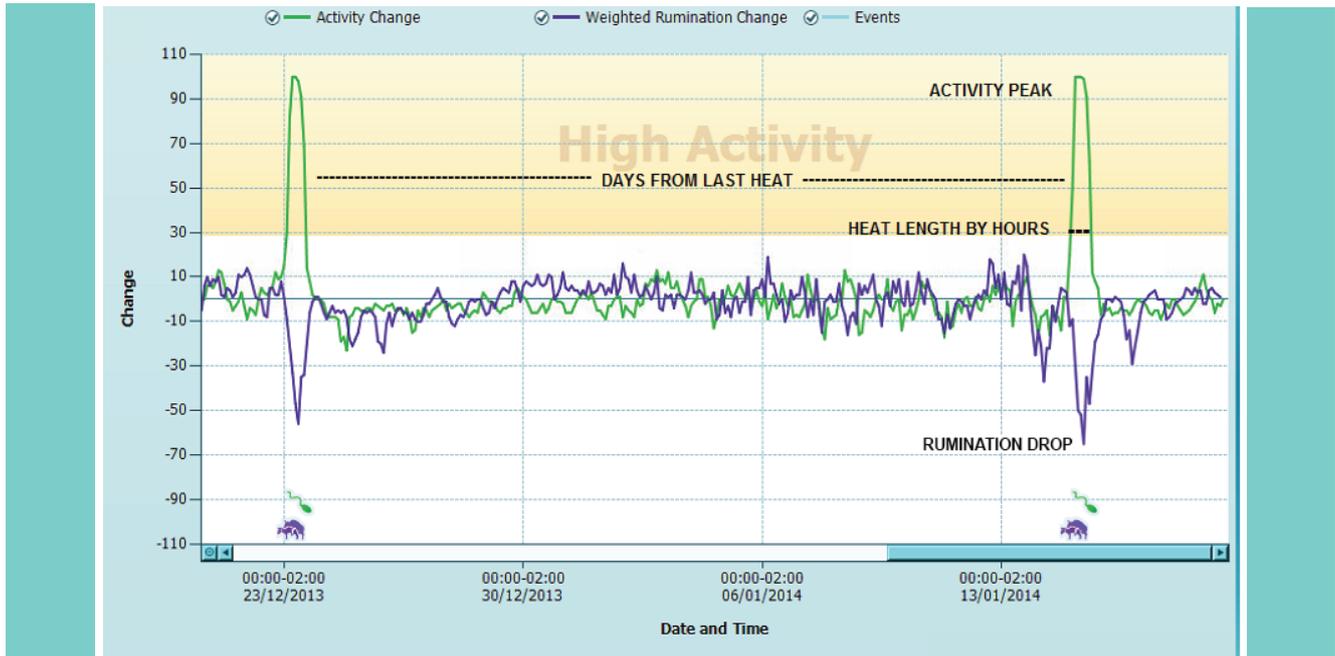


- 1 Cow calved; delivered twins
- 2 Post-Calving distress alert was sent to the farmer
- 3 Cow treated for fever and retained fetal membranes
- 4 Second Post-Calving distress alert sent; cow needed more attention
- 5 Cow recovers

Heat detection

The vast majority of cows in estrus will exhibit a drop in their rumination level. SCR's Heat Index uses this rumination information in the calculation of the cow's individual heat index, thus increasing the efficiency of heat detection based on activity levels alone.

The next figure displays the typical relation between rumination and activity on the day of estrus.



Nutrition

The trigger for the cow to start ruminating is rumen fill. The part of the feed that contributes to the rumination process is the long fibre part of the ration. During the rumination process the long fiber of the ration is broken down, enabling the rumen bacteria to digest the fiber. Rumination time is proportional to the amount of long fibre that the cow has eaten. Cows will ruminate about 140 minutes per 1 kg of long fibre consumed. As such, changes in ration content and/or the ration's physical characteristics will be reflected in rumination time changes.

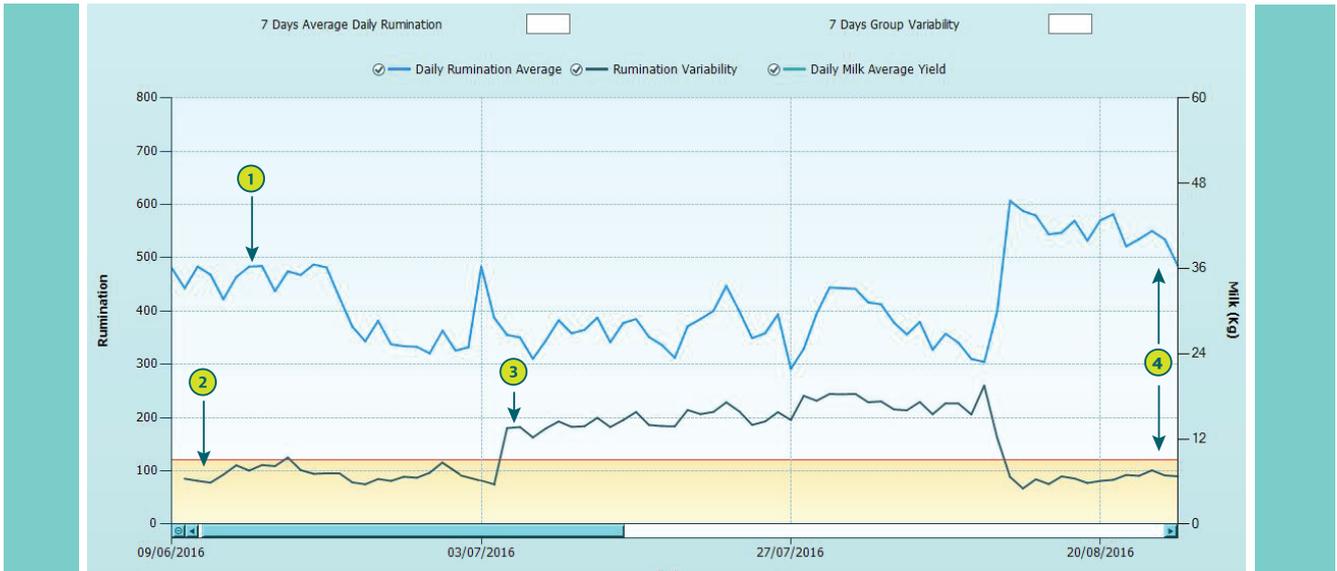
In a typical dairy, feed and feeding management is usually very consistent. When a steady feeding schedule is maintained, one can expect a consistent rumination level on the group/herd level. Once a constant level of rumination is established, any exceptions will indicate that there is a problem either with the ration itself, or with the feed management on the farm.

Daily rumination time of less than 400 minutes per day is considered low rumination, and is a major indicator/risk factor for rumen acidosis, due to less saliva production and insufficient rumen buffer. Rumen acidosis seriously impairs cow's health, welfare and farmer income.

SCR's **Group Consistency graph** gives the farmer an easy way to monitor feed consistency and identify factors that may be affecting the herds rumination. Using SCR's system, farmers can monitor not only milking cows, but also dry cows and replacement heifers.

In addition to monitoring rumination trends in both the short and long-term through the graph, the calculated **Last Week group standard deviation** is a useful performance indicator for optimising feed efficiency. Lower variability values reflect more stable rumen flora, which is essential for optimal nutrient digestibility.

In the following graph, the group rumination standard deviation (the lower line) reflects how variable the cows are in their daily rumination. Biological rumination standard deviation is typically between 50-80 minutes/day. When issues affect a proportion of the herd we see the variability increase greatly, as seen in this example when there was a herd level issue of acidosis when transition feeding.



- 1 Group rumination average
- 2 Group rumination variability within expected norms
- 3 Transition feeding management issues causes a decrease in group rumination average and a significant spike in group variability.
- 4 Group rumination and variability returns to normal

SCR. Make every cow count

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