

# Time for Technology

## Temping Dairy Cows the Easy Way

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Traditionally, the best dairy farmers have been people who have the ability to sense subtle differences in appearance, behaviour and performance of their dairy cows. Having this skill allows them to respond earlier and more effectively than the rest of us to health problems and other factors that require attention. We call those elusive skills “cow sense” and while some of it can be taught, to a large degree you either have it or you don’t. For those of us who don’t, some of the emerging technologies that we have labelled “precision dairy management” may be an opportunity to buy “cow sense” off the shelf. One particular piece of equipment that reflects this possibility very well is a sensor for body temperature contained in a bolus that is placed in the reticulum, in the same way that we have traditionally applied magnets for hardware prevention. Research development of such technology dates back to the 1990’s, but it is only recently that commercial companies have started marketing these systems to dairy farmers in the US and Canada.

There are two well defined times when knowing the body temperature of the cow can be a great asset to management. Many of the best dairy herds already lock up fresh cows once daily to record rectal temperature for the first 10 days after calving. This information is particularly helpful in identifying cows with uterine infections or pneumonia. Producers tell us that a rigorous protocol for temping fresh cows and treating those with fever with antibiotics leads to improved production in early lactation and better reproductive performance. An automated system would save the farmer the time he now spends restraining the cows, taking the temperatures and recording the data, and it would save the cow the aggravation of being separated from the herd. Especially for these fresh cows the ability to measure temperature while they are undisturbed would be a big plus since they need all the feed, water and rest we can give them.

The second area where body temperature is well known to be of great diagnostic value is in determining the time of ovulation. While we have all heard of childless couples who ritually use this tool in an effort to determine the time of highest fertility, dairy producers cannot justify the time and labour to restrain and temp every open cow to establish the time of ovulation. But if we can capture this temperature spike with automated equipment, there is little doubt in my mind that this could lead to better timing of insemination and higher conception rates.

A third practical use of body temperature in management can be the prediction of calving time. Numerous research papers report that body temperature starts to go down markedly about 48 hours before calving. Hence, this could become a very practical tool for deciding who goes into the calving pen when.

A search of the web currently offers three companies marketing this technology in various forms. A company called Bella Health developed a system that combines RFID animal identification in a bolus that reads out a current body temperature at the time a cow passes a panel reader, usually on the way into or out of the parlor. An Ontario dairyman already using this system is quite enthusiastic about it, both as a tool for heat detection and for identifying health problems. But since this system is read only at milking, the information can be a little stale. Because the sensor is in the reticulum, the recorded temperature plummets each time the cow drinks water, and if this occurs shortly before the sensor is read, a false low temperature is reported. Two other commercial systems overcome these shortcomings by using battery powered “active” devices that transmit the temperature at fixed intervals to a receiver that can be up to 400 feet away. By capturing and interpreting the data in real time, the information becomes much more current. Using computer software, these systems can isolate and count the temperature drops associated with drinking, thus adding valuable data about drinking events without confounding the real body temperature. The Smartstock bolus sold by an Oklahoma company, Smartstock LLC is in use on several large dairies in the USA. In a research trial at Guelph, work with this bolus suggested that higher temperature readings from this device may also prove to be a useful predictor of rumen acidosis.



**Rumen Temperature Bolus, returnable to the manufacturer for re-charging and re-use**

Perhaps the most sophisticated of these systems is the SmartBolus from the TenXsys company. This bolus transmits data about animal ID and temperature, as well as movement of the device. To date, these movements are being used to report high activity associated with a cow in heat but there may also be potential to quantify rumination and even identify contractions associated with calving. The combination of activity and temperature is also interesting in itself and points to the concept that interpreting data from multiple sensors may be the most valuable

approach of all. For example, a high temperature combined with increased activity is more likely ovulation while a high temperature with decreased activity is more likely a sick cow.

While our understanding of how to use the temperature information is still quite limited, the SmartBolus appears to do a pretty good job of heat detection, making this an interesting option for anyone shopping for a standalone pedometer system. The bolus includes a two way radio, a temperature and motion sensor, a system to regulate frequency of transmission and a memory component, making it the complex and costly component of the system. It sells for just under \$100 and has a battery life of 4 to 6 years. Initial cost for boluses in a 200 cow herd will be \$20,000 and with a 30 % replacement rate and some older cows exceeding the battery life, annual costs will be about \$7000 per year. The cost of components external to the cow is listed as \$4000 plus installation. With normal herd replacement rates my guess of the cost per cow per day of this system would be around 14 cents.

At this stage of the game, no one can say with certainty what the monetary value of the information generated will be. But I am willing to bet it will be substantially more valuable than anyone realizes today. For now it may be sufficient to say . . . if it gets cows into the calving pen on time, if it nips uterine infections in the bud, if it gets fresh cows off to a better start, and gets them pregnant with fewer days open and fewer vials of semen, then it may be the tool that turns everyday ho-hum management into a “cow sense” success story.