

Time for Technology

RFID Ear Tags on the Farm

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For the past 8 years Canadian dairy farmers have faithfully tagged dairy cows with approved National Livestock Identification Program (NLID) ear tags. For the past 5 years these tags have included a “button” which carries a unique radio frequency signalling device or radio frequency identification (RFID for short) that brings the tag and dairy cow ID in general into the computer age. As technology goes, this device itself is not that new. The “transponders” used by dairy equipment companies in parlor identification and in computer feeders for the last 20 years work in exactly the same way.

On the industry level, the fact that every day cow in Canada has a unique tag for life provides a measure of food safety and animal health surveillance that we did not have before. A permanent record of who the tag is issued to, provides a record of the farm where an animal is born. Presently the regulations require that all animals are tagged when they leave the farm, and while there is no requirement to read it, the capability to do so is gradually improving record keeping en route to new destinations. The tag or its bar code or numeric equivalent is always read at slaughter, so every animal can be traced back to the farm it originally came from. A new \$20 million federal initiative to upgrade readers at auction barns was announced in July and this money will be spent to help to identify the route the animal followed over its lifetime voyage to the slaughterhouse.

In terms of use on the farm, it is likely that a large majority of these tags are not read a single time before that final reading at the slaughterhouse. On the few farms that have automated calf feeders, the tags are used to identify calves when their allotment of milk replacer is mixed and fed, and Dairymaster, a minor player in the milking equipment business, uses the tags for cow identification in milking parlors and sort gates. But for most farms there is absolutely no use made of the radio frequency component of these tags.

In bigger herds, where cow recognition and handling become time consuming jobs, these tags have the potential to open the door to paperless management. In order to explore this potential, Canwest DHI and OMAFRA conducted a field trial at two farms last year. Both farms were set up with the “pocket cow card” version of the DairyComp 305 management software, which provides an interface between a handheld computer and the larger main computer on the farm, so that data needed in the barn can be downloaded to the handheld and read in the

barn, and data collected in the barn can be entered in the hand held, and later transferred to the main computer. This device alone can eliminate the need for paper, but the task of visually reading ear tags and mentally processing the numbers remains time consuming. To automate that component the trial herds were given wireless “wand readers” that could read the electronic ear tag and compare its unique ID to the stored cow numbers of cows that require handling. They were also given wireless headphones that provided audible signals, such as a simple beep for a tag that was recognized but not needed for handling, or specific words such as “preg check, 40 days bred” for a cow requiring this attention.

Much was learned about the specific hardware tested in the project. Initially an Allflex wand reader with Bluetooth capabilities was combined with the Dell Axim handheld but this handheld had to be kept dry by a protective case called an “Otterbox”. It had one Bluetooth channel which allowed interaction with the RFID wand, but required that the headphones be connected by wire. This hand held was discontinued by the manufacturer and was replaced in the project with the HP iPAQ. This unit had its own waterproof case and two Bluetooth channels providing for wireless connection with both the wand reader and the operator’s headphones. This enhanced the freedom of movement which was considered a big plus by the users. Good fitting headphones are essential when using a handheld in the noisy and sometimes poorly lit environment of the barn and total wireless connectivity allows the operator to set the handheld aside while doing two handed jobs such as hoof trimming. One of the herds suggested they would like a third bluetooth port so both the herdsman and veterinarian could hear the audible instructions during the vet check.

The other hardware tested was the Psion all in one handheld and wand, a product that has a reputation for being durable in damp and dirty environments and able to withstand the abuse it will receive in a dairy barn. The standard wand attached to this datalogger is quite short but in this case an optional wand which can be extended up to 3 feet proved useful for reaching over the cows back in a management rail, or reading ear tags from behind cows in headlocks.

Time required for cow handling and management activities were recorded on each of the two pilot farms before the adoption of the RFID technology and again after the RFID technology was introduced and the staff were trained and familiar with its use. Activities recorded were injections for synchronization, vaccinations, breeding, herd health checks, fresh cow body temperature checks, and dry cow treatment. The time and labour required for making the list of cows needed, giving the treatment, and recording the information was monitored, along with the number of cows sorted or restrained, the number of cows treated and the time cows spent in the headlocks or management rail.

In one of the project herds the overall results were not very positive. In this barn cows were handled in headlocks at the feed manger, but due to overcrowding, only 85% of the cows in the

group could be locked up at once. Reading ear tags on unrestrained cows with wand is no easy task because it requires holding a “stick” within a foot of her ear, and that is a much bigger challenge than visually reading her ear tag. Once a visual/paper system is needed for one cow, the benefits of paperless ID for the rest disappear. The other problem in this herd was that the herdsman was accustomed to identifying and treating cows in one pass, and now needed two hands to do his needling and a third to hold the wand. What we did learn here is that headlock systems can involve lengthy interruptions of the cows normal routine. This was an Ovsynch herd and milking cows were locked in twice per week after the morning milking. Our records showed that the first cows out of the parlor were locked up and average of 216 minutes per week or 108 minutes each time the headlocks were used. The longest single time was 2.5 hours. Although there was feed in front of the cows, they were unable to drink or rest during this time. While we were unsuccessful in this herd, this shows that if we can reduce the time needed for handling it will benefit the cows as well as the operator. In other headlock herds without overcrowding, the automated system is being used effectively with a different routine. In these herds, all the cows in headlocks are “wanded” and cows requiring treatment are “pinned” so their headlocks cannot open with the main release. If more than one type of treatment is being given, cows getting the less common treatments are marked on the forehead with a marker. Once this pass is completed, cows that are not needed are released and a second pass is made, without the wand, with two hands free for needling.

In the other project herd the equipment proved to be very beneficial in reducing labour. This herd had a management rail and normally sorted small numbers of cows on several days per week for different treatments. The automated system made it easy to identify specific treatments needed making it possible to sort more cows on a single day and apply different treatments at the same time. This herd recorded fresh cow temperatures and found substantial time savings from not having to write things down and also from directly downloading information from the handheld to the office computer. Convenient data entry has also allowed this herd to expand the management information they collect and store. For example hoof trimming details are now being added to the data base via the handheld computer. They also report that the long wand makes cow identification safer and simpler since there is never a need to climb on the rail or ask for help to read a difficult, manure covered tag from the rear of the cow. While time saved by the operator is one big benefit, bigger yet is the efficiency they have gained during the bi weekly herd health visit by the vet. Records show that since this system was put in place, quicker access to accurate information has reduced the time needed for herd health by 20%. Not only does this save operator time which we included in cost benefit calculations at \$15 per hour, but it reduced the vet bill at a rate of \$100 per hour.

The cost of automating cow identification on this farm was a one-time investment of \$2200 for the handheld computer and RFID wand and a one-time software upgrade worth \$685. Annual

software fees are \$150 per year. We also included 5 hours of training for the operator at \$15 per hour, making the total cost \$3110 in the start up year and \$150 per year after that.

Combining treatments reduced the time spent by cows in the management rail by 75% from just over 2 minutes per cow averaged over the herd, to 0.5 minutes per cow. For the operator, the greatest time saving was in the area of recording events. Previously the treatments and events were written down on a paper list produced out of Dairy Comp. These notes were then used in the barn and results from examinations were entered manually into the farm computer. With the RFID equipment the event recording happened in the handheld at the time of the treatment. The data were uploaded to the farm computer by means of a docking station. Entering the results of the herd health check before the RFID would take 29 minutes for a group of 90 cows, while with the RFID equipment it took 3 minutes or 90% less time. For this 540 cow herd the weekly time saving was one hour or \$780 CAD per year (\$1.44 per cow) using \$15 per hour wage. During the time of the herd health visit, the 20% reduction in time on the farm for the veterinarian resulted in \$1000 saving per year (\$1.84 per cow). In this herd the \$1780 direct benefit will pay for the initial investment in under two years. In smaller herds the payback may be longer but it would appear that in a freestall setting with more than 100 cows this technology can be a cost effective and convenient management tool.