



## **NEWS RELEASE**

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Immediate Release

### **Cold can affect RFID tag retention: researchers**

HUMBOLDT, SK – Winter in the Canadian west can be biting cold, as this winter has proved. When we head outdoors in temperatures below -30°C, we’re advised to bundle up to protect ourselves from the cold. Researchers at the Prairie Agricultural Machinery Institute (PAMI) are now asking farmers to keep something else under wraps in those cold temperatures – uninstalled RFID tags.

Radio frequency identification (RFID) tags are an important part of tracking individual cows from birth to slaughter, and their use on Canadian cattle has been mandated through the Canadian Cattle Identification Agency (CCIA). A number of tag options have been approved by the CCIA for use in the Cattle Identification Program because they met the program’s criteria for retention, readability, and the ability to withstand tampering.

However, producers are still having problems getting the small, round, yellow tags to stay in place on an animal’s ear. This is why a team of researchers at PAMI has been looking at reasons for the retention problems and what can be done to fix them.

“We recognize there is frustration among producers related to tag retention, and we wanted to address it,” said Dr. Joy Agnew, a member of the PAMI research team. “We used an engineering approach to systematically test the mechanical strength of RFID tags to determine if all tags are the same, if some are weaker, or some are stronger.”

They tested six types of RFID tags, following best practices for their application. Those best practices included using compatible fronts and backs (i.e. from the same manufacturer), and using the correct applicator for each brand of tag.

The team then measured the force it takes to break the tags apart in different ways, and looked at each brand of tag to see which were the least variable in terms of performance, which were stronger, and which were the easiest to insert. They also tried inserting the tags at different temperatures.

What they found was that all met the basic strength requirements set out by the CCIA; however, temperature was shown to have a profound effect on the tags.

“Inserting the tags in the cold and comparing their strength with warm-applied tags was something about the tags that we believe no one else has tested,” Agnew noted. “The whole effect of temperature on tag retention was a question mark.”

In the PAMI test, both tag and applicator were brought down to -30°C and then the tag was inserted. The tag was then brought back up to an ambient temperature before its strength was tested.

“We found that if the tags were inserted cold, they were much weaker than those inserted at room temperature,” Agnew noted.

Tags were also more difficult to insert when they were cold and broke apart far more easily, even when back at room temperature.

These results show that it is best to avoid tagging animals in extremely cold temperatures. If it cannot be helped, producers should keep both applicator and tags warm while the tagging is taking place. This is something that producers can add to their list of best practices, Agnew noted, right alongside using the proper tool to apply the tags.

“Producers need to ensure that they are using the right applicator for the right tag components – no mixing and matching,” said Agnew. Using one brand of applicator with another brand of tag, or mismatching the front and back of the tags resulted in poor retention.

In summary, to help with retention, it is recommended that producers:

- Follow directions for application given by each tag manufacturer
- Use the correct brand of applicator for each brand of tag
- Ensure the back and front of each tag are of the same brand and model
- Try to avoid tagging animals in extremely cold temperatures. If it cannot be avoided, keep both tags and applicator warm while tagging
- Be sure to place the tag in the proper position on the animal’s ear
- Have an experienced person with a good amount of strength in their hands apply the tags
- Cut twine off bales when feeding cattle. Loose twine hanging out from bale feeders can cut tags off when animals pull their heads back from the feeder
- Use appropriate parasite/lice herd health treatments to prevent cattle from excessively scratching against fence lines and feeders, risking tag removal
- Record each animal’s RFID tag number in on-farm records before tagging is completed, along with its management ear tag number. If the animal loses its RFID tag and needs to be re-tagged, the management tag can be used to cross-reference its original RFID tag with its replacement. This ensures that the birth date linked to the animal’s original RFID tag is brought forward to its new tag

PAMI researchers are continuing their study of RFID tag retention this year. One of the goals of their investigation is to determine the force required to pull the tag through a cow’s ear, as this is a common cause of tag loss. They also plan to assess the performance of pneumatic applicators as opposed to hand-operated devices to see if a constant application force improves tag strength and reduces variability of strength, and there is a possibility of conducting some cold breakage testing as part of the study as well.



**Figure 1** Radio Frequency Identification (RFID) tags are an important part of tracking individual cows from birth to slaughter, but some producers report poor retention after installation.



**Figure 2.** The insertion force required to apply the RFID tags was tested during the PAMI research team's test procedures.



**Figure 3.** Shear force (above using twine), along with tensile and impact tests were conducted on six different brands of RFID tags during the PAMI test procedures.

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For more information contact:

Dr. Joy Agnew  
Project Manager  
Prairie Agricultural Machinery Institute  
Humboldt, SK 306-682-5033, ext. 280

Keri Dalman  
Communications Coordinator  
Prairie Agricultural Machinery Institute  
Humboldt, SK 306-682-5033, ext. 102