National Tag Retention Project
2011 -2015

National Tag Retention Project Genesis

Canadian Cattle Identification Agency's (CCIA) Cattle Implementation Plan (CIP) Committee and Technical Advisory Committee (TAC) worked together to form a CIP sub-committee to complete a tag retention study in a variety of environments in Canada as a way of better determining the long-term retention rates and operability of the current set of approved CCIA radio frequency identification (RFID) beef cattle tags used in Canada to address the following issues:

• Industry's growing concerns regarding the effectiveness and long-term viability of the types of approved tags available, and the fixture mechanisms commonly used to manufacture tags for Canada, and

• Poor tag retention within the value chain affects the accuracy and availability of livestock traceability data, which affects response time in an emergency (e.g., animal disease outbreak, flood, tornado, contaminated feed supplement recall).

NOTE:

• The CIP Committee's role is to work collaboratively with industry and governments to identify the targets, steps and issues in implementing traceability in the cattle industry.

• The TAC's role is to provide a forum for discussion of technology and information management and to make recommendations to CCIA's board of directors regarding changes or improvements affecting the Canadian Livestock Tracking System (CLTS) database and agricultural traceability in Canada.

Funding

• The National Tag Retention Project was funded through support from Agriculture and Agri-Food Canada in 2011 and 2012. In 2013, CCIA received funding through the Assurance Stream of the Agri-Marketing program under Growing Forward 2, a federal/provincial/territorial agreement, to complete the final two years of the study.

• Through the support of provincial governments and cattle associations, all participating producers were supplied with approved CCIA RFID tags for their calves as well as an approved CCIA RFID reader as an incentive for their time and use of their cattle in the project.

Objective

• The National Tag Retention Project's objective is to collect baseline data on cattle tag retention and tag readability, and recommend solutions to enhance tag retention and readability.

• The broad-based approach and survey of the existing situations was designed to provide the foundation for identifying specific tag retention challenges that may require further data collection for further study.

• The National Tag Retention Project monitored tag performance from 2011-2015.

Key Research Aspects

1) This project involves animals from various geographical areas in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario to ensure appropriate representation of production practices and environments. The number of herds in each province was based on cow herd distribution based on Statistics Canada data.

2) This study has tagged and scanned 2,000 calves, 1,000 yearlings and 700 cows with approved Canadian Cattle Identification Agency (CCIA) radio frequency identification (RFID) tags, ensuring distribution of all approved tag types and brands for use at each test site.

3) Farm test sites were selected based on appropriate handling facilities to optimize tagger safety, tag application and tag retention. Refer to Figure 1.

Figure 1

4) Each tag type was applied according to manufacturer's directions in terms of recommended tag location and using the corresponding manufacturer's tag applicator.

5) All approved CCIA RFID tags were scanned prior to placement, and applied only when the producer was handling the animals within normal management activities.

Results for Calves and Yearlings

• This study tagged and scanned more than 2,000 calves and 1,000 yearlings at farms of varying sizes, management conditions and locations in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario.

• The overall tag retention rate for calves exceeded 96 per cent in all herds with six ranches reporting no lost tags in the followed calves. The overall tag retention rate for yearlings was 99 per cent, with tag retention varying from 98 to 100 per cent.

Results for Mature Cows

• More than 700 cows were followed for up to four years in this project at 11 farms of varying sizes, management conditions and locations in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario.

• In the final year of observation, the average tag retention rate for mature cows averaged 82 per cent in the animals remaining in the study (i.e., up to four years).

• Tag losses increased year over year from third to fourth year suggest lifetime tag retention may be unrealistic.

• Though a trained crew using consistent methodology applied all tags during the project, tag retention ranged from 48 to 100 percent amongst ranches and animals remaining in the study in the final year of observation.

Lessons Learned

• All tags that were applied and retained during the project were readable; therefore, tag retention and readability were found to be equal in terms of performance for the tags that were applied and retained during the project.

• This project demonstrates tag retention is high in animals from birth to yearling stage.

• This project demonstrates tag retention is unsatisfactory for the lifetime of a mature cow or breeding stock.

• The variation in results suggests not all causes of tag loss are random. This project recorded tag loss without identifying the reasons for it. This project determined further study would be useful to clarify the role of climate, geography management and tag brand in tag performance.

• For consistency and to maximize tag retention, this project's field team adhered to the following best practices recommended by approved beef tag manufacturers for maximizing tag retention during the project:

1) Ensure the animal is properly restrained to stabilize the animal's head while the tag is being applied.

2) Apply tags as recommended by the tag manufacturer's directions.

3) Use the recommended tag applicator and pin for the specific tag type and brand (i.e., there is no universal applicator that works with all tag types and brands).

4) Use tags and applicators that are clean and free of debris.

5) Apply antiseptic to tag and tag applicator between animals while tagging to help control infection. NOTE: Some approved CCIA RFID tags are prepared with disinfectant prior to packaging and sale.

6) Disinfect both sides of the animal's ear before applying the tag; do not tag ears covered in debris.

7) If possible, tag animals in moderate temperatures.

8) Do not apply a new tag in a hole from a lost tag.

9) Ensure the male portion of the tag is on the back of the animal's ear.

10) For ideal placement, apply tags at approximately one-quarter of the length of the animal's ear from the head between the two branches of cartilage. Refer to Figure 2.

head   1/4   1/2   3/4   end of ear

Figure 2
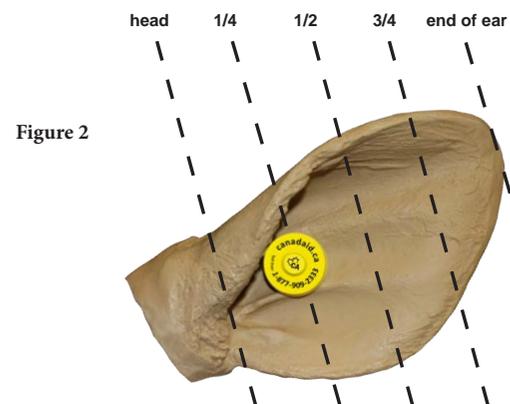
Using the Final Results

• In addition to recommending solutions to enhance tag retention and readability, CCIA intends to use these findings to ensure tag manufacturers are accountable for the performance rating of the regulated devices they manufacture.

• At the inception of the animal identification program for beef cattle, tags were tested for use in the national system.

• Whether/not intended, this project observed and recorded tag retention for a longer period than required by current tag-testing standards for field trials (i.e., one year).

  o Since some provincial regulations and breed organizations require livestock operators to apply approved tags within the first 90 days of an animal's life, and the lifecycle of most animals in the value chain exceeds one year, current tag-testing standards for field trials should be extended beyond one year.

  o RFID tags are passive devices designed to function without battery power for the lifetime of the animal, which is the expectation and pre-requisite for a unique identifier in a fully-functional livestock traceability program.

Designing Future Studies

As an inaugural project of this magnitude, CCIA and its project team learned many things throughout the project's timeline and process:

• Multi-location, multi-year projects are difficult to manage and implement. Invariably, circumstances arise that alter methods and affect results. Many aspects are beyond the control of the study principles. While it may not be possible to control these circumstances, the situation and response should be documented. Uncontrollable risk factors affecting this project include:

  o Cull rates by season;

  o Project design versus application (i.e., integrity in the field);

  o Limited scheduling notice and time-constraints for scanning opportunities, resulting in missed scans;

  o Volunteer participation versus sufficiently-incentivized participation, resulting in limited project participation;

  o Exit or attrition from participating herds.

• In future projects, CCIA will make a concerted effort to apply a single-hypothesis design, determine the unit of measure, clearly define the outcome and how it will be measured, as well as identify and address all stakeholders and their needs from the study at project inception. The goal of future tag retention research will be to understand which environments cause tags to fail, and to ensure each tag has an equal opportunity to succeed or fail.

• CCIA will submit these findings to support regulating/enforcement bodies to include some degree of tolerance in the enforcement policy for untagged animals (i.e., animals that have lost their approved CCIA RFID tag after tag application).

Unavoidable Obstacles and Challenges

• The study was unable to obtain full participation from the targeted number of ranches.

• The study faced the loss of ranches during the study, changes to the study scan schedule, and incomplete scanning schedules on participating ranches.

• The study was further weakened by the loss of animals from participating ranches and incomplete scanning of animals retained in the herd, which created uncertainty about some aspects of the outcomes.

• Losses also result in a smaller sample size, which limits the study's ability to find significant differences.

• Full explanation of the factors causing variation in tag retention would require more sophisticated data collection, management and statistical analyses than were conducted.

Image Gallery

Right: Using a restraining device such as a chute (with a head-gate and/or neck-extender if possible), to ensure the animal is properly restrained, which helps to stabilize the animal's head during tag application. This best practice optimizes tagger safety, ideal tag placement and tag retention.

Refer to Figure 3.

Figure 3

Figure 4

Left: Three examples of tag degredation and improper tag placement witnessed in the field.

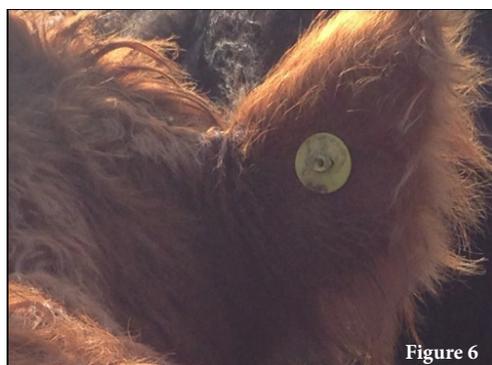Refer to Figures 4, 5 and 6.

Figure 5

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Figure 6

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