National Tag Retention Project

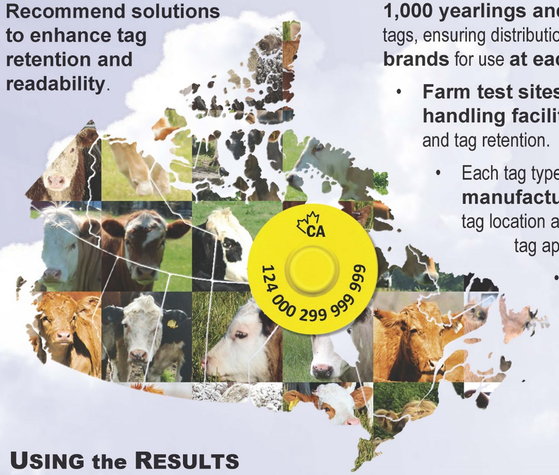
Genesis

Canadian Cattle Identification Agency's (CCIA) Cattle Implementation Plan Committee and Technical Advisory Committee worked together to form a 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. The study was designed to address these two 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).

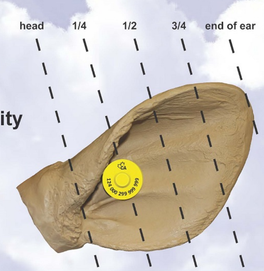
Dual-Targeted Objective

1. **Collect baseline data on cattle tag retention and tag readability**, and
2. **Recommend solutions to enhance tag retention and readability**.



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.
- **Tag retention is high** in animals from **birth to yearling** stage.
- **Tag retention is unsatisfactory for** the lifetime of **a mature cow or breeding stock**.



Ideal placement: Apply tags at ~1/4 of the length of the animal's ear from the head between the two branches of cartilage.

- 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**.
- **This project's field team adhered to the best practices** recommended by approved beef tag manufacturers for tag application.
- **Uncontrollable risk factors** affecting this project include: cull rates by season; project design versus application (i.e., integrity in the field); limited scheduling notice and time-constraints for scanning opportunities, resulting in missed scans; volunteer participation versus sufficiently-incentivized participation, resulting in limited project participation; and exit or attrition from participating herds.

Using the 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, one-year tag-testing standards for field trials.
  - 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**.
  - 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.

Key Research Aspects

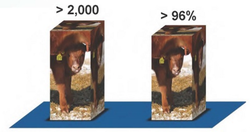
- This project involves animals from **various geographical areas** in B.C., A.B., S.K., M.B. and O.N. to ensure appropriate representation of production practices and environments. The **number of herds in each province** was **based on cow herd distribution,** based on Statistics Canada data.
- This study has **tagged and scanned 2,000 calves**, **1,000 yearlings and 700 cows with** approved CCIA RFID tags, ensuring distribution of **all approved tag types and brands** for use **at each test site**.
  - **Farm test sites were selected based on appropriate handling facilities** to optimize tagger safety, tag application and tag retention.
    - Each tag type was **applied according to manufacturer's directions** in terms of recommended tag location and using the corresponding manufacturer's tag applicator.
      - All approved CCIA RFID **tags were scanned prior to placement**, and applied only when the producer was handling the animals within normal management activities.

Obstacles

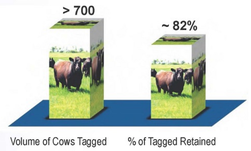
- The study was **unable to obtain full participation** from the targeted number of ranches.
- The study faced the **loss of ranches** during the study, **changes to the** study scan **schedule**, and **incomplete scanning schedules** on participating ranches.
- The study was further weakened by the **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.

Results

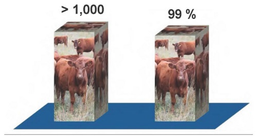
CALVES tagged and scanned at farms in B.C., A.B., S.K., M.B. and O.N.



MATURE COWS tagged and scanned at farms in B.C., A.B., S.K., M.B. and O.N.



YEARLINGS tagged and scanned at farms in B.C., A.B., S.K., M.B. and O.N.



- This study **tagged and scanned more than 2,000 calves** and **1,000 yearlings** at farms of varying sizes, management conditions and locations in B.C., A.B., S.K., M.B. and O.N.
- 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 percent.
  - **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 B.C., A.B., S.K., M.B. and O.N.
  - **In the final year of observation, the 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**.
- **Tag retention ranged from 48 to 100 percent amongst ranches and animals** remaining in the study **in the final year** of observation.

Future Studies

Measurement

- 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.

Prediction

- 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.

Hypothesis

- CCIA will submit these findings to support regulating/enforcement bodies to include some degree of tolerance in the enforcement policy for animals that have lost their approved CCIA RFID tag after tag application.

Theory

This 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 AgriMarketing program under Growing Forward 2, a federal/provincial/territorial agreement, to complete the final two years of the study.

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Canadian Cattle Identification Agency