ELECTRONIC ANIMAL IDENTIFICATION

Individual animal identification is important for record keeping and data collection to better manage animal performance and management of animals. Animal identification is the primary element of any livestock management or traceability system.

The sheep industry has several methods for animal identification: ear tags (visual and electronic), ear notches, ear tattoos, paint brands and implants. Ideally, animal identification should be easy to read, easy to apply, permanent and resistant to loss or tearing. Currently the most popular types of identification for sheep are visual ear tags and paint brands. Official identification of animals is required for most types of movement in the U.S.; USDA approved identification devices, which include visual and electronic options, must be used for these purposes.

Electronic identification (EID) also referred to as Radio-Frequency Identification (RFID) is becoming increasingly popular for the livestock sector. EID systems use Radio Frequency (RF) technology to read and transmit animal identification numbers wirelessly. Data collection is fast and accurate and reduces human error. Many countries require EID as part of their national animal disease traceability programs. RFID ear tags are offered in the same shapes, colors, and sizes as visual ear tags to accommodate different livestock species and needs.

RFID TAGS & READERS

There are three basic components of a RFID system when used for animal identification: transponder (ear tag/implant), RFID reader, data storage and processing software. The information presented in this factsheet is on RFID ear tags as it is the most common system in the U.S., and globally, for identifying and tracking animals electronically.

RFID ear tags encapsulate a microchip with a copper coil antenna which has a unique animal identification number programmed into it that can be read by a compatible reader. The microchip contains a unique 15-digit number, pre-programmed in at the factory, which consists of a three-digit country (840 for the U.S. official tags) or a manufacturer code plus a 12-digit individual animal number. Unlike visual barcode tags, an RFID

ear tag can be read outside the line-of-sight and without physical contact between the ear tag and reader.

RIFD ear tags are available in two types – two-piece button or panel-shaped ear tag and a one-piece loop ear tag. In an electronic button tag, one of the discs contains the RFID transponder whereas in the electronic loop tag, the RFID transponder is in a molded compartment on the tag. RFID tags are available in different colors and can be customized to accommodate farm/premises information, flock identification, animal identification numbers, logos, and official identification information.

The RFID reader retrieves the unique 15-digit number stored in the animal ear tag. The reader can be a simple hand-held device that just displays the number that was on the chip it just read. It may also be a more advanced reader that not only displays the tag number but also stores the tag number in its memory or enters the tag number into an internal database. These readers may also further transmit the tag numbers to an external device such as a scale or computer. These readers are often called a wand and powered by batteries. Another option is a stationary panel reader which an animal will pass by. These panels are often mounted on a raceway or scale box to capture the ear tag numbers as the animal walks through the reader's scanning field. The data retrieved from the reader can be stored on a separate computer, tablet, or cell phone, or built directly into the reader.

Low Frequency (LF) is the most proven RFID technology and most widely available in the U.S. and other countries. Official LF tags and readers comply with international standards (ISO 11784/11785) that define how tags store and send the information to the reader. Any ISO compliant reader will read any ISO compliant tag and are therefore brand neutral – any manufacturer's reader should read any manufacturer's tags.

Ultra-High Frequency (UHF) tags allow for animals to be identified from a longer distance. Currently, there is not an ISO standard for UHF products regarding how animal data is stored on the tag, data transmission or product construction. Therefore, UHF product brands cannot necessarily be mixed and matched with each other. Readability requires line-of-sight between tag and reader. Readers are usually arranged to ensure that one

animal does not block the ability to read the tag of another animal.

The readability distance of RFID tags can vary depending on how the tag is manufactured and designed and the design and size of the antenna. Many countries have established readability specifications and compliance requirements for RFID products. In the U.S., the consumer determines the specifications that work best for their situation, except for official tags which are approved by USDA.

MANAGEMENT SOFTWARE

Processing and managing the information captured from the animal identification numbers is one of the most beneficial pieces of an EID system. There are many software programs for livestock that are designed to manage and analyze information captured from an EID system. Many of these software programs offer features to accommodate the unique needs of the operation. Software programs can range from farm management software for individual producers to keep records and produce reports for making management and production decisions to a national database system for recording animal movements for disease traceability. Software can be PC based, Web based or on portable devices such as tablets, cell phones or the reader itself.

BENEFITS

An EID system provides many opportunities to improve flock productivity and profitability through automation capabilities, recording and monitoring individual animal production traits, generating electronic movement documentation, and by facilitating participation in product verification programs. An EID system may allow for the recording of any metrics that can be measured. The electronic collection process reduces transcription errors and speeds the data collection saving both time and labor while increasing the accuracy of information recorded.

EID systems can provide an opportunity to gather information and provide feedback on carcass and product quality from processors. These systems can contribute to consumer awareness and confidence via enhanced transparency made available by the information gathered from the electronic identification system. Additionally, EID systems can provide trading partners with information that can increase confidence in product safety, allowing for the industry to better position itself to capture value on the global export market for lamb and wool as opportunities are presented. This technology is being employed for this purpose in some competing markets.

A key benefit is EID systems can contribute to an immediate and effective management and mitigation of animal disease outbreaks. Many countries – such as the United Kingdom – have implemented a national animal traceability system utilizing this technology. EID systems allow for an easy and rapid means for providing animal movement information during an animal disease outbreak, for contact tracing and disease containment. Information collected by non-electronic means – i.e., paper – is limited in terms of quickly or accurately tracking animals, which increases the risk of not being able to contain an animal disease outbreak.

Since the EID ear tag numbers may be read visually, there is no expense required for electronic readers or other infrastructure in order to meet official ID requirements.

CHALLENGES

EID systems can vary widely in terms of complexity based on the circumstance such as on-farm management or animal disease traceability. The complexity of an EID system can directly influence the cost. Cost is often cited as a challenge in implementing EID systems within segments of the sheep industry.

Depending on what data and information is being collected, RFID tags might be sufficient. An example of this would be for the collection of carcass data and information provided by a processor or for a national disease traceability program that just tracks animal movements. While RFID tags are often more expensive than visual tags, increases in demand have resulted in lower costs.

If there is an objective to capture the production and management benefits, such as tracking animal performance or reducing labor, then the full system – RFID tags, reader, and software – is required. Similar to tags, increases in demand have resulted in a range of readers and software at different price points.

Implementing an EID system can be overwhelming. Before investing in an EID system, it is important to identify what information is to be collected and the expected gain. An investment analysis is often recommended to determine if an EID system is economically viable or not. Expected expense and projected benefits of an EID system should be analyzed relative to the current identification system, as well as across different EID system options. As demand for EID systems has increased, new technology has become more accessible making EID systems more affordable.