Electronic ID in the Beef Industry

Steve Blackburn
Allflex, USA
Waynesboro, GA

What is Electronic ID or Radio Frequency ID?

The most basic form of electronic identification is barcodes. Barcodes are used in a wide array of applications. However, they have proven fairly ineffective in the livestock industry because of the environment in which they must be utilized. Basically, when a bar-coded tag becomes dirty it is difficult to read. While it can be cleaned up and read, this process is time consuming and has generally been deemed impossible at feedlots and packing plants where processing speeds and chain speeds are of paramount importance to the bottom line of the operation.

Therefore, the next level of electronic identification is radio frequency identification. Radio Frequency Identification uses low frequency radio transmission to send a signal between the ID device and an antenna (reader). RFID eliminates the need for "line of sight" reading because the signal penetrates body tissue, wood, plastic, mud and manure. Transponders (The electronic device inside the tag) are passive (no battery) electronic devices molded along with an antenna into a plastic, two-piece tag. They are activated (powered up) when an antenna and reader send an electronic signal out which is picked up by the tag. The tag responds by sending a pre-programmed identification code back to the reader device.

Half Duplex Versus Full Duplex

This Read and Respond process can occur in two different ways. One is called Half Duplex and the other is Full Duplex. With the Full Duplex method the tag sends a signal on one radio frequency and receives a signal on another frequency. Basically, both the send and receive signals operate "Full" time. In the case of the Half Duplex method the send and receive signals occur on the same frequency. Thus, the reader first sends a signal and subsequently "Listens" for the response signal from the tag. Essentially, the tag sends "Half" of the time and receives "Half" of the time. Half Duplex technology has been widely utilized throughout the production livestock industry whereas Full Duplex has only been heavily utilized in other industries. The reason for this is because Half Duplex gives you the greatest read range. This longer read range is important in the packing plants and livestock markets so that the ID can be read and recorded without requiring the animal to be completely restrained.

International Standards

Another key feature in electronic identification is the International Standards Organization's (ISO) rulings regarding electronic ID in livestock. The ISO has established a joint Half Duplex/Full Duplex AB@ standard for Electronic ID. The standards, embodied in ISO #'s 11784 and 11785 ensure compatibility of systems and interchangeability of data and reader systems. What this means to producers is that there is at least limited interchangeability of components between suppliers of different types of technology.

Types of EID Devices

Implants have long held promise in many people's mind of being a permanent and unalterable ID device potentially replacing branding. However, they have been proven to be difficult to implant and their read range is dramatically reduced as compared to some other options. In addition, it is impossible to detect when an animal has an implant without knowing

exactly where it is or simply scanning all of the possible locations on the animal. More important is the difficulty in reading and recovering the implant at the packing plant. Because the implant is a foreign device, it must be recovered at the plant to prevent its possible entry into the food chain. This process of recovery is extremely difficult at best.

Boluses hold the same potential promise of a unique unalterable ID that could potentially replace branding. However, they have some inherent negatives as well. In price, they will always be a premium priced product to both implants and tags. Also, and more importantly, they are extremely difficult to remove at the packing plants. High speed, high volume packing plants are simply not designed and are not easily adapted to recovering boluses in an animal. Additionally, the read range on boluses is often very directional making them difficult to utilize in an automated fashion. Furthermore, it is impossible to tell when an animal actually has a bolus in it or if a bolus has been lost or is simply no longer working. And finally, no one has ever adequately addressed the question of what happens if an animal has two boluses in it.

Thus far, producers have overwhelmingly chosen tags as the answer to the need for reliable, accurate identification in feedyards, livestock markets and packing plants. They are easily, quickly, and accurately read in virtually any type of location where the animal is restrained, and with half duplex technology, it is possible to read animals that are not restrained at a limited distance. This opens the possibilities for automated sorting and multiple ID gathering opportunities.

What do you need to effectively utilize EID?

An electronic identification tag is not a system. It takes the integration of the EID tag, a reader and a data-recording device to create even the simplest system. And, at that point, all you'd really have is a fairly expensive means of reading an animal's identification. So it is important to remember that there are a myriad of options available. Some of those options will be better suited for one type of application versus another. In order to truly utilize the value of EID, you have to put together a true data collection, or animal management system. Data collection systems and animal management systems can be quite complex, or they can be very simple. In general, if you want to effectively utilize EID, you need four things:

> 1) An EID Device
> 2) A Reader
> 3) A Computer
> 4) Software

An EID Device - that would be the tag.

A Reader - There are a number of different types of readers available from stationary readers for packing plants, to walk through readers for livestock markets, to wand readers for any location where large numbers of animals are processed and has power available, to hand held, battery powered readers for smaller numbers of animals or any location that does not have power to it.

A Computer - There are a number of different types of computers available. You can use a desktop or laptop computer, like you can buy at your local computer shop. Also available are hand held devices that are a combination of a reader and a hand held computer. Additionally, the computer can also be something as simple as a scale head. Tru- Test, Reliable and Digi-Star sell scale heads that work directly with various readers and, in certain circumstances, eliminate the need for another computer on site.

Software - There are dozens of companies and

systems that offer different types of software programs, many of which work directly with EID. There are parlor systems for Dairies and Feedyard systems for Feedlots, as well as Cow/Calf systems for Beef Producers and multi-segment and multi-species programs available which all utilize a computer right at the chute or in the parlor. However, there are other options as well. If you choose to go with an integrated reader and hand held computer, the software to read and collect data may come with the unit. If you elect to go with a scale head, those heads can be purchased with software that will allow you to download the data from the head and then export it into a spreadsheet or database.

How is EID currently being used?

Cow / Calf - Many ranchers are currently more comfortable with recording data in the manner which they have always recorded their information and are manually correlating the electronic number with their visual herd management numbers. In this scenario, the rancher may not even need a reader at all or only need a simple reader to verify that the tag is working properly after it has been applied. Other ranchers are beginning to utilize portable reading devices attached to laptops or to hand held computers in order to be able to use them at multiple locations. As EID becomes more commonplace and as producers pioneer more and more ways to utilize EID on their own operations these options will expand.

Stocker & Backgrounders - These operators are only beginning to develop their niche for EID. To date, the most common use in these operations are in those that are providing a service for ranchers to vaccinate, wean, and bunk break cattle for special process verified sales that require EID to validate those processes. In those cases, the operators are recording the health treatments that they perform on each calf along with that calf's

EID number. That data is then being made available to the buyers of the calves at these specialized sales.

Feedyard - Most feedyards are utilizing a wand reader to record an animal's ID along with other data at their processing chute and/or hospital chute. This reader simply reads the ID device and sends that signal to some other device like a scale head, a data collector, or a computer. Depending on the information which the feedyard wishes to collect, the yard may combine this reader with only a scale head or with several other devices such as an ultrasound machine, a digital thermometer, a hip height measurement, etc. Oftentimes, they are then recording other information such as treatment regimens and disease diagnosis. These are often no different than the data which they have been gathering for many years except that they are then associating that data with an individual animal ID.

Packing Plants -The fully automated plants have a large panel antenna/reader installed which is directly linked to the In-House tracking system, which positively identifies each trolley; thus eliminating any potential errors in the system. There is no human intervention required and will in fact read and record EID numbers, even if no one is aware that there are EID tags on the cattle. With that said, different systems have different levels of reliability. If a system is used on a regular basis it should be very reliable. However, if the system is used infrequently, its accuracy can and should be questioned.

In general, each of the groups has identified ways to make EID valuable to them. But, the most valuable part of EID is the sharing of individual animal information across entities and the ability to begin correlating the cause and effect relations of various practices throughout the life of the animal.

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