

USING RFID EAR TAGS TO COMPLIMENT INDIVIDUAL ANIMAL RECORD-KEEPING

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Introduction

Due to regulatory or policy issues, it appears that some form of rapidly retrievable and computer manageable system of ownership trace back of beef cattle will be implemented in the future. The management and economic consequences of such a system are largely unknown to livestock operators in New Mexico. The beef cattle research group working at the NMSU Corona Range and Livestock Research Center (Corona Ranch) recently implemented an electronic identification system in addition to the traditional visual ear tag identification system. The system has been in place nearly one year.

In March of 2003, a cooperative effort at the Corona Ranch was initiated to investigate the possibilities of implementing an individual animal Electronic Identification system (EID), using radio frequency technology, for crossbred cattle. The objectives of the project were; 1) implement, demonstrate and test EID technology and uses on New Mexico ranches, 2) determine EID ear tag retention for New Mexico range cows and calves, 3) determine the cost of and factors associated with implementation and use of an EID system and 4) streamline research data collection and recording.

Various EID systems have been developed including retinal imaging, iris scanning, and barcode ear tags. These systems use readers that require an unimpaired line of sight to the individual animals' eye or ear tag barcode. A Radio Frequency Identification System (RFID) which uses unique radio frequencies and eliminates line of sight scanning needed for other EID systems seems to be the most economical and easily adapted for the livestock industry and was the one decided upon for the Corona Ranch.

Implementing Electronic Individual Identification at the Corona Ranch

After initial investigation into available EID products and systems, it was decided to adopt an affordable system that was compatible with our current equipment (load cells from Tru Test were already in place with electronic scales) and software. This required us to upgrade our digital scale indicator (scale head) and purchase an RFID reader that plugged into the new scale indicator, and was compatible with the computer and software already in use. The system that was purchased has the capability to automate the recording of individual animal weights (within seconds of standing on a scale) and any additional performance measurements taken during a work day. Additionally, we compared the cost of ear tags, the services and availability of technical support while implementing the RFID system.

In December of 2003 it was decided to implement a simpler RFID system on the ranch's ewe flock to aid in ewe identification and record-keeping, as well as, to demonstrate and compare a lower cost, less automated system.

Implementing the Comprehensive EID System

To put the comprehensive RFID system into operation for cattle on the Corona Ranch, we were required to purchase and apply RFID ear tags to each cow. To read the tags we also

needed to purchase an RFID tag reader. A handheld 6-volt stick reader was purchased to give us the capability to plug directly into a PC or our scale indicator. This reader allowed us to electronically read the RFID number and animal weight together and record the electronic data automatically.

The Corona Ranch has used individual electronic scale systems for a number of years. The use of these already existing scales made it easy for us to adopt the additional RFID technology. The previous scale indicator was not designed for the handheld tag reader so we needed to upgrade our existing scale indicator to a newer version that incorporated this technology. All of the above components allowed us to digitally record animal identification and weight to the scale indicator chute side. Later in the ranch office, we download all the information to the computer in a text format or as a spreadsheet file. The ranch has also been using a herd management software program that is compatible with the electronic scale system, therefore allowing us to download the animal identification and weight data directly into our herd management software within minutes of weighing the last cow. If needed, we can sort through production records to make management decisions before cattle are turned back to pasture.

The RFID ear tag that we chose for our cattle was the Allflex "EID" tag with matching Tamperproof Maxi Female that retails at \$3.80 per set. This price includes the RFID transponder tag and a larger visual drop down ear tag with the transponder number printed on top and our management numbers printed in large text on the main body of the ear tag. The cost for only an RFID ear tag is approximately \$2.00 from various sources. The total cost to complete the RFID system, excluding ear tags, was \$4393 which includes an electronic scale installed under a squeeze chute, a handheld stick RFID tag reader, a personal computer and the software (Table 1).

The capabilities of this system include: individual animal performance recording; automated or manual electronic weight recording; the ability to instantly compare current weight to a previous weight with a calculated average daily gain; the ability to store BCS, pregnancy status, or other information. This digitally recorded data can also be downloaded directly to herd management or spreadsheet software for immediate or later data retrieval.

Implementing the Simple EID System

To incorporate the simple RFID system on the ewe flock at the Corona Ranch we used the same RFID handheld reader and the PC, therefore we had to simply purchase RFID ear tags for all the ewes. It was also necessary to purchase a "serial wedge" software program that would interpret the information from the reader, and directly input the ear tag information into any software application we desired. This allows us to scan an ear tag and have that ID number automatically placed into the spreadsheet or herd management program we are using, and then manually input the animal weight into the desired field.

The RFID ear tags we chose for the ewe flock was the RFID ear tag from National Band and Tag Company and cost \$2.62 per head. This includes the RFID transponder ear tag with the required Corona Ranch USDA premise identification number imprinted on the ear tag for the scrapie eradication program which also serves as our New Mexico Livestock Board ownership or brand requirement for inspection purposes. If purchasing all the hardware and components to integrate this RFID system (excluding RFID ear tags) it would cost \$1229

which includes a handheld stick reader, a laptop computer, and the software (Table 2). However, utilizing the previously purchased RFID stick reader and PC, we only had to purchase the “serial wedge” software application CPS Plus! from Download.com for \$29.

The capabilities of this system include; electronic entry of EID number into any software application; additional production measures or information can be manually entered into the same software applications; and the ability to sort animals by any criteria immediately after data entry and before turning back to pasture.

Observations and Results

More than 150 RFID ear tags with matching visual tags have been applied to all the commercial crossbred cows and calves since May 1, 2003, and over 250 RFID ear tags were applied to the ewe flock on December 10, 2003. During the nine months that the cows and calves have worn their tags there has been no loss or malfunction of the RFID ear tag. However, 3 percent of the visual ear tags were lost during this 9-month period. This is very similar to our previous ear tag losses. The ewes have only worn their ear tags for a little over two months, not long enough to make any observations concerning tag loss or management compatibility. However, it is assumed that a higher RFID ear tag loss will be incurred with the ewes than with the cattle due to daily contact with net wire fencing. Both systems have decreased labor involved in recording and maintaining individual records.

Summary

The effect of the RFID system has been either one less person required for recording individual data, or freeing up the person that would manually record data to allow for more time pushing individual animals through the lead up to the scale. Additionally, the RFID system has decreased the time necessary to record individual data, nearly eradicated data recording errors, as well as, eliminated steps to later transcribe records to a computer system. One of the more convenient elements of the system is the instant access to weight and BCS changes chute side from previously recorded dates, as well as, immediate predefined sorting criteria that can be displayed as the animal is scanned. This allows for time savings by allowing for animal sorting based on weight or BCS changes, pre-defined treatments, pre-defined pasture assignments, and pregnancy status immediately and may reduce animal handling. The RFID tag itself appears to have a better retention rate than the conventional drop down visual tag.

Overall an RFID system may compliment an in-place record-keeping system that can facilitate or increase the frequency of individual production measurements and enhance the access to previous individual animal production measurements. With the added convenience, the electronic recording of these measurements and the electronic file sharing of such data can lead to an increase in livestock productivity and lower the associated labor costs, while increasing available information when making important livestock management decisions. Either system can be adapted to fit and work with any current system of livestock record-keeping.

Table 1. Cost of components necessary for the Corona Ranch comprehensive EID system.

Component	Cost/\$
Serial Handheld Stick Reader	400
Electronic Scale System	
Heavy Duty Load Bars	1365
Installation Supplies	130
RFID Compatible Indicator	1499
Laptop PC	800
Herd Management Software	199
Total Cost	\$4393
RFID Livestock Ear Tag	\$2 to \$4/hd

Table 2. Cost of components necessary for the Corona Ranch simple EID system.

Component	Cost/\$
Serial Handheld Stick Reader	400
Laptop PC	800
Serial Wedge Software	29
Total Cost	\$1229
RFID Livestock Ear Tag	\$2 to \$4/hd

~~OIL AND GAS ISSUES ON FEDERAL LAND~~

~~N. K. Ashcroft and C. D. Allison~~

~~As mineral exploration and production increases the potential for impact to the surface also increases. Oil and gas production is an important component of our economy, whether you consider the national economy, the state economy, or even some county economies. In 2002, there were 700 oil and gas related companies operating within the New Mexico economy, these companies employed an estimated 9,300 people. Nationally, New Mexico ranks 2nd in natural gas production, 3rd in proven gas reserves, 5th in crude oil production, and 4th in proven oil reserves. In 2002, there were 21,771 active oil producing, 23,261 gas producing wells, and 456 CO₂ wells within the state (New Mexico Energy, Minerals, and Natural Resources Department "New Mexico's Natural Resources 2003).~~