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A Model for Data Collection and Reporting for Cow/Calf and Feedlot Operations

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Introduction

Multiple forces are moving the beef industry toward complete traceability of meat products. The cattle industry is producing food for consumers and their demands are evolving to include food safety, nutrient value, natural/organic production, antibiotic-free, genetic preference, animal husbandry (process verification), source verification and traceability. There is a growing worldwide adoption of country mandates for traceability.

The livestock industry has been working for several years to develop data collection and reporting models. The need for completion and implementation of these models from birth to slaughter and eventual consumption has been elevated due to Homeland Security issues.

The National Animal Identification Plan is being developed by a task force and is sponsored by the National Institute for Animal Agriculture. This is a joint effort of industry and government. The plan will serve as a template for standardization of identification numbering systems and establishment of standard format specifications of required data that will be associated with an animal.

Individual identification of cattle will require additional inputs associated not only with the cost of the identification device but also the labor and equipment needed to read, record, and store the individual identification number and related data at each of the production segments. As individual identification is used in the future to facilitate collection and analysis of production data it will become increasingly important that the ID systems are reliable and efficient to use. The success of an individual identification model will include identification at an early age and allow for data collection throughout the animal's life cycle.

The objectives were to evaluate the relative ease of use and efficiencies associated with the collection and recording of individual identification numbers and early life date at the Utah State cow/calf ranch operation. The evaluation included the identification devices, the hardware used to record the individual data as well as the data collection software.

Materials and Methods

Calves born in 2001, 2002 and 2003 were identified using both a plastic ear tag with visual ID number and an electronic identification device. A Windows based desktop/PDA Palm based software application BeefMetrix™ was used to collect cattle registration records at birth using a Handspring

Visor PDA. A universal electronic ID reader designed for the Handspring Visor unit was used to scan the EID number directly into the software. The calf registration information collected included EID number, visual ID number, birth weight, sex, birth date, color, breed, dam visual ID and sire ID. To facilitate data collection in the second year (2002) drop down "pick" menus were added for color, breed, sex, and a pop-up calendar for date selection.

Data entered into the handheld device was transferred to the desktop computer by placing the PDA device in an attached docking cradle and running the HotSync operation. Health observations, diagnoses, and treatments for sick calves were recorded and entered into the desktop version at later time. The data collected was available locally and was also uploaded to off-site data storage utilizing the XML file format. The central database provided for disaster data protection and consolidated data reporting.

A different Windows based desktop software application ChuteSide™ was used to collect processing information at arrival in the university feedlot. Only minimal data was collected at the feedlot. This information included the electronic ID, visual ID, arrival date and arrival weight. This data was available locally and uploaded to the off-site data storage utilizing a text file format.

An internet-based portal application platform MetrixPro™ GAM™ Portal was utilized to provide a secured environment for warehousing collected data for reporting, analysis, and information exchange. The portal is housed at a "tier one" host site to provide maximum connectivity. An Oracle 8i enterprise database optimized for online analytical processing (OLAP) serves as the primary data warehouse. Business intelligence tools were utilized to create and work with reports in a dynamic fashion. Stored data can be view in tabular format, transformed into various types of charts, and downloaded into spreadsheets for use on a local computer. All data in the portal is protected by VeriSign's SSL secured (128 bit encryption) certificates.

Results and Discussion

Both methods of identification were effective with greater than 95% retention rate and no animal's identity was lost using the dual identification method. The software contains a module that keeps track of retag events in the event the either the visual or electronic tags fail. In spite of the fact that the Visor PDA and reader are not ruggedized they are currently being used to collect the third (2003) calf crop.

The primary problem encountered during the first two years involved rapid depletion of battery power. Data stored in non-resident PDA programs is lost if batteries are completely depleted. This resulted in re-entering data on several occasions. Two primary causes of rapid battery loss includes extreme cold temperatures and leaving external devices, i.e., the EID reader attached to the unit when not in use. A third condition that resulted in data re-entry was changing the batteries in the PDA with the reader attached. Keeping these potential problems in mind and with more frequent data synchronization one third (70 head) of the 2003 calf crop is currently registered, no data has needed to be re-entered, and the batteries have not been changed yet. In addition a low battery indicator has been added to the BeefMetrix™ software to warn the operator when batteries are below 20% capacity.

Initial feedback from Utah State personnel, and another large Utah based ranch, the health module has been improved to include standardized drop down pick menus for disease diagnosis and for health products used in the calves for disease treatment or prevention. The program was also enhanced to facilitate adding multiple products and procedures to an animal's individual record quickly during processing events like branding and weaning. These new components were used to collect complete health product and process history on the 2003 and 2004 calf crop. As this is an ongoing collaborative industry/Utah State effort future objectives include testing a new feedlot chuteside data collection system with standardized health product process naming structure and standardized XML format for data transfer. An additional objective is to collect and integrate at the portal level individual carcass data on the steers from future crops.

Introduction of students to new data collection hardware and software was integrated into the Beef Management course in 2002. In the future the use of online data reporting and analysis will be

integrated into the Beef Production Management courses. This hands-on experience with new data collection and management tools will provide Utah State University students with skills they will need in the future.

Conclusions

Collecting, maintaining, and utilizing individual animal data can be used for differentiation of products "branding," to assist with supply chain management, and enhance consumer confidence by providing specific production information. At a more basic level, we can utilize collected data to make early life cycle interventions (i.e., production management decisions). These management decisions may include genetic selection, product use, feeding practices and marketing of cattle.

Realization of a value proposition will require the ability to coordinate and share data across all industry segments. This model includes both local data availability and uploads to off-site data storage providing for both disaster data protection and consolidated data reports. The level of access security provided by VeriSign's SSL secured (128-bit encryption) certificates assures the user data is protected. The use of large coordinated databases in conjunction with the Internet allows for real-time reports generated on the farm or production facility as often as management demands. This model will also allow for facilitation of audit or verification systems.

Table 1. Example of online ad hoc report downloaded to an excel spreadsheet.

Dam Vid	Calf Vid	EID	Color	Weight	Sex	Birth Date
4084	1326	985120010238596	Yellow	88	Steer	04/07/01
4084	2142	985120012513589	Black Motley	92	Heifer	03/20/02
4101	1312	985120010236040	Yellow	93	Heifer	03/08/01
4127	1119	985120010239359	Yellow	92	Heifer	03/12/01
4127	2129	985120011665133	Yellow	107	Bull	03/11/02
4127	3059	985120012492608	Yellow	110	Steer	02/06/03
4138	1120	985120010242946	Yellow White Face	80	Steer	03/13/01
4138	2099	985120011667472	Yellow	91	Bull	02/20/02
4138	3085	985120011708164	Yellow	83	Heifer	02/12/03
4140	1006	985120010246798	Yellow	63	Steer	01/24/01
4140	1005	985120010241054	Yellow	82	Steer	01/24/01
4140	2075	985120011668878	Yellow	91	Heifer	02/15/02
4140	3070	985120011607663	Yellow	109	Steer	02/10/03
4145	1035	985120010248900	Yellow	95	Steer	02/05/01
4145	2105	985120011659483	Yellow	100	Heifer	02/22/02
4150	1039	985120010247963	Black	50	Heifer	02/06/01
4150	1040	985120010241834	Black	65	Heifer	02/06/01
4150	2156	985120012493390	Yellow	101	Heifer	03/24/02
4161	1058	985120010245939	Yellow	109	Steer	02/09/01
4161	2049	985120011662919	Yellow	106	Bull	02/08/02
4161	3088	985120011568908	Yellow	103	Steer	02/12/03

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