Field Evaluations and Applications of Electronic Identification (EID) Systems in the Bovine Industry

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Introduction

Automatic identification of members of the bovine family is very important in present and future developments of livestock production. From securing export of healthy live animals and meat with genetic superiority to automating health records and production records; automatic identification has the potential to play a significant role in the livestock industry.

The technology evaluated is the implantable, passive, electronic identification transponders manufactured by Destron/IDI, of Boulder, Colorado. Transponders were implanted in over 4549 animals during 1991 and 1992 in the United States, Canada and England, evaluating the following:

(1.) implanting technique
(2.) transponder retention
(3.) automation with various animal production systems
(4.) carcass identification within the slaughterhouse
(5.) slaughterhouse recovery of transponders
(6.) disease eradication programs
(7.) breed registration
(8.) alternative identification to branding and other forms of identification.

The above items will be discussed in some detail as related to the trials performed on animals.

Materials and methods

The implantable identification devise used is a battery-free, passive miniature transponder with its own 10 digit hexi-decimal, permanent laser encoded identification number (e.g. 7F7D1C0E70). The transponder is a glass sealed cylindrical device 29mm x 3.5mm. When the transponder is activated by a low power radiofrequency signal, it transmits its ID code to the reading system.

The injecting system is similar to a hormone injection system specifically adapted for use with the transponder. The injector system was purchased from Hundon-Forge Company located in England. It consists of a multiple-shot injector with a capacity of 10 transponders per cartridge. The system requires a specially adapted needle to properly allow safe and successful injection.

The reading systems in these field trials were of two types:

1. portable, battery operated with memory and RS232 port

2. stationary walk-through "flap" reader with memory

FIELD TRIAL PROCEDURE

Trial 1:

1.1 One thousand four hundred and eighty-nine mature dairy and beef animals were injected subcutaneous in the middle third, on the dorsal side of the left ear.

1.2 Animals were read at 1, 3 and 12 weeks post-injection (see Table 1).

1.3 Eight-hundred and fifty animals were slaughtered with removal of the left ear in the slaughter plant using routine slaughter procedures.

1.4 Reading system panels were installed in one slaughter facility to gain experience and scan-ability in the slaughterplant in the restrainer.

Trial 2:

2.1 Three thousand six hundred and fifty adult animals were implanted just beneath the medial and ventral to the scutiform cartlidge such that the needle ended up medial to the scutiform cartlidge, depositing the transponder. The transponder used was 20 mm X 3.0 mm.

2.2 Ninety day post-injection readings were obtained utilizing 2 portable readers.

2.3 112 dairy cows were identified with a walk-through (flap) reading system installed in a Colorado milking parlor. This data represents over 2500 reading presentations (see Table 2).

2.4 Slaughter readings and recovery data of these dairy cattle transponders is not yet available.

RESULTS and DISCUSSION

Field Trial 1

It was concluded from the data (table 1) that experience with the large transponder injected into the middle-third ear site performed less than desirable. The site allowed more exposure of the transponder to chutes, stanchions and other obstacles on a typical farm environment, resulting in an overall failure rate of 10.6 %.

The result of ear and thus, transponder exposure to facility obstacles presented added trauma to the transponder capsule causing glass fracturing.

This location provided for easy removal of the transponder at the slaughterplant. The disadvantage of this site is it is too easy to remove from the sub-cutaneous layer of the ear in the live animal. This ear site reduces the ability for its reliability as a secure and tamperproof form of identification.

Reading of carcasses in the slaughterplant allows animal identification to occur throughout the slaughter process. Carcass merit incentive will be easier to implement with such an identification system tracing animals back to their sire and dam, allowing a producer to make more knowledgeable culling decisions and genetic selections.

This current lack of genetic feedback may become obsolete with the possible cooperation of the packer and cattle industry. Meat and carcass quality assurance programs will also be easier to implement with this identification system, allowing accountability to positively be traced back.

Disease eradication traceback systems are dependent on accurate identification. Implantable transponders provide the catalyst from the Veterinary level of positive ID of blood and tissue samples through the laboratory and slaughterplant.

There have been recent estimates of the per animal cost of hide defects to the cattle industry. Most recent estimate is over $ 16.00 per animal. Implantable ID provides an additional benefit as an alternative to branding which allows a favorable identification method from an animal welfare standpoint.

Eight hundred and fifty animals were slaughtered and read in a Canadian slaughterplant with a stationary panel reading system. The result of this trial was a reading rate of 97%. This encouraging information proved the ability of such a

reading system to interface with the data collection mentioned in the above text.

Field Trial 2

The same evaluation and discussion applies as in Trial 1 with the following exception.

Transponder placement in the sub-scutiform cartlidge site was seen as much more favorable than the sub-cutaneous Trial 1 site for the following reasons:

* Well protected, less exposed to breakage
* Tamperproof anatomical site
* Easier target to inject
* Less difficulty of damage to the injecting person

An additional evaluation took place in a dairy farm milking parlor. The reading result of cows entering the parlor and passing through a flap reading system resulted in a positive read rate of 98.2 % This data was calculated from 2500 animal presentations through the flap reading system.

CONCLUSIONS

It is concluded that the electronic identification system tested in Trial #2 provided acceptable results in retention and lack of breakage of .012 %

Further adaptation of the technology integrated into feeding, milk recording, Veterinary data recording and analysis, carcass feedback, disease control and a variety of other systems, will provide an opportunity for the livestock industry to advance. It will allow more efficient collection and utilization of data from these important entities of livestock management and production.

Table 1
Implantable Transponder: Middle Third on Dorsal Side of Left Ear

Country	# of Animals	Transponder No Reads *	Percentage of Failures
U.S.	100	8	08.0%
U.S.	300	48	16.0%
Canada	690	90	13.0%
U.K.	249	7	02.8%
Other	150	5	03.3%
Totals:	1489	158	10.6% Avg. Failure Rate

* : Failed to read, breakage or rejection at 90 days

Table 2
Implantable Transponder: Sub-scutiform Cartilidge

Country	# of Animals	Transponder No Reads *	Percentage of Failures
U.S.	110	1	1.00%
Canada	400	3	0.75%
Canada(D)	2000	30	1.50%
U.K.	400	2	0.50%
Other	150	1	0.60%
Totals:	3060	37	1.20% Avg. Failure Rate

* : Failed to read, breakage or rejection at 90 days