Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 334

2002

Practical aspects of beef carcass traceabilityin commercial beef processing plants using an electronic identification system

J.R. Davis

Michael E. Dikeman

Recommended Citation

Davis, J.R. and Dikeman, Michael E. (2002) "Practical aspects of beef carcass traceabilityin commercial beef processing plants using an electronic identification system," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. https://doi.org/10.4148/2378-5977.1737

Practical aspects of beef carcass traceabilityin commercial beef processing plants using an electronic identification system

Abstract

The use of an electronic identification (EID) system in slaughter facilities holds great potential as a tool for animal and carcass traceability, if used as part of a comprehensive carcass tracking system. However, the correct association of each carcass with its individual EID tag number may be hindered at several points during the slaughter process. For 2,994 cattle slaughtered in 14 lots and bearing buttontype, full duplex EID ear tags, 113 (3.92%) had non-functional tags, 16 (0.53%) had no tag, and 37 extra head were introduced accidentally into one of our lots. Of the 2,994 carcasses, 71 (2.37%) were railed out for further trimming, 8 (0.27%) were retained for further inspection, 3 (0.10%) were condemned, and 1 carcass fell from the rail. For the plant in which data were collected, the hot-carcass scale operator ultimately had the responsibility for assuring that lots of carcasses accurately represented lots of cattle slaughtered. Although the current systems in some plants may be adequate for cattle traded on a live basis, they may not insure exact matching of live animals and their respective carcasses.

Keywords

Cattlemen's Day, 2002; Kansas Agricultural Experiment Station contribution; no. 02-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 890; Beef; Electronic identification; Traceability; Beef cattle; Beef carcasses

PRACTICAL ASPECTS OF BEEF CARCASS TRACEABILITY IN COMMERCIAL BEEF PROCESSING PLANTS USING AN ELECTRONIC IDENTIFICATION SYSTEM

J. R. Davis and M. E. Dikeman

Summary

The use of an electronic identification (EID) system in slaughter facilities holds great potential as a tool for animal and carcass traceability, if used as part of a comprehensive carcass tracking system. However, the correct association of each carcass with its individual EID tag number may be hindered at several points during the slaughter process. For 2,994 cattle slaughtered in 14 lots and bearing button-type, full duplex EID ear tags, 113 (3.92%) had non-functional tags, 16 (0.53%) had no tag, and 37 extra head were introduced accidentally into one of our lots. Of the 2,994 carcasses, 71 (2.37%) were railed out for further trimming, 8 (0.27%) were retained for further inspection, 3 (0.10%) were condemned, and 1 carcass fell from the rail. For the plant in which data were collected, the hot-carcass scale operator ultimately had the responsibility for assuring that lots of carcasses accurately represented lots of cattle slaughtered. Although the current systems in some plants may be adequate for cattle traded on a live basis, they may not insure exact matching of live animals and their respective carcasses.

(Key Words: Electronic identification, Traceability, Beef cattle, Beef carcasses)

Introduction

Increased producer ownership through slaughter has revealed a need for accurate animal and carcass traceability from the standpoints of carcass merit, carcass payment, and meat safety. Current protocols in many commercial beef processing plants, however, are inadequate to accurately trace carcasses back to individual live animals. Electronic identification (EID) use in slaughter facilities has shown great promise as a tool for traceability, if used as part of a comprehensive carcass tracking system.

For most slaughter floors, it is somewhat naive to assume that individual ear tags will always be read and matched exactly with carcass identification numbers. Potential exists for the sequence of carcasses moving through the slaughter floor to be altered from the sequence in which animals were slaughtered by one or more head per lot. Cattle may be temporarily railed out of the carcass sequence if they require additional trimming, fall from the rail, or are retained. The hot-carcass scale operator must keep track of carcasses railed out of and returned to the carcass sequence, a system that is not infallible. Also, lots may be accidentally mixed in holding pens. Cattle may be re-associated with their lot only if each animal in that lot bears a common tag.

Our objectives were to conduct a field evaluation of EID system tags, and evaluate the carcass tracking capabilities in a large commercial beef slaughter plant.

Experimental Procedures

In a 1-month period during the fall of 2001, we followed 2,994 cattle slaughtered

in a large commercial beef plant. Cattle were slaughtered in 14 lots ranging in size from 99 to 311 head, with an average of 214 head. All cattle were originally identified with a full-duplex, button-type EID ear tag. Because no error during tag reading was tolerable, tags were collected sequentially from cattle at slaughter and returned to Kansas State University to be read. During tag collection, incidence and location within kill sequence of animals missing tags were recorded, and incidences of non-functional tags were recorded during tag reading. Each carcass was identified with a sequentially numbered "kill order tag" applied as early as possible during the skinning process. We also recorded the incidence of lots of cattle mixed together by plant employees in the holding pens.

At a point following carcass splitting, and before the hot-carcass scale, USDA personnel inspect carcasses. Should any carcass need further trimming, the carcass may be railed out of the sequence of carcasses crossing the kill floor and re-inserted after trimming and USDA inspection. Records were kept of carcasses that were railed-out and carcasses from cattle slaughtered in other lots that were railed in. Records were also kept of carcasses that fell from the rail, were retained, or were condemned.

Results and Discussion

This field evaluation is not a tag endorsement; therefore, brand names are omitted. The tags used in this study were full-duplex, button-type EID ear tags. The other predominant type of EID tag is a half-duplex tag. Functionally, the two types of tags differ in their reported read range and speed of reading. Full-duplex tags read faster (50-60 milliseconds versus 70-80 milliseconds), but have roughly half the read range of half-duplex tags (2.8 ft. versus 5 ft.). Tags using either full or half-duplex technology are manufactured by competing companies. We were informed by the company using half-duplex technology that the 3.92% tag failure rate in our study was quite high as compared to half-duplex technology, but we have not seen any data to this effect.

Sixteen of the 2,994 cattle (0.53%) were missing ear tags. In 1 of the 14 lots, an additional 37 head of cattle not belonging with our lot were mixed with our lot by errors in the holding pens. These cattle had no common lot tag and were virtually indistinguishable from our cattle. The only means of identifying our cattle was by their EID tag. Had one of our cattle been missing a tag, we would not have known which one it was. We were fortunate that this occurred within the last 10 head of our lot and that none of our remaining cattle had missing tags. Mixing of cattle in the holding pens is fairly rare, but it happens. In most instances, only one or two animals will jump a fence, and will either be returned to their lot or identified with a series of marks on the hide.

Carcasses will normally arrive at the hot-carcass scale in the same sequence as that in which the animals entered the kill floor originally. However, two events may alter this. The first (and least frequent) is when a carcass falls from the rail. Carcasses seldom fall prior to the hide pulling station, but worn trolleys and feeble tendon attachments may be stressed to the point of failure by the downward hide puller. Fallen carcasses must be trimmed extensively and tediously inspected by USDA inspectors. The single carcass that fell in our study was in the center of the kill floor, away from visual contact by Kansas State personnel. Therefore, neither the hot-carcass scale operator nor we were aware of the fallen carcass until some time later.

The other (and most common) event that may alter the carcass sequence is when a carcass is railed-out because it did not get

split, requires additional trimming, or is retained. Seventy-one carcasses (2.37%) in our study were railed out for further trimming and/or splitting prior to inspection. A carcass may be retained for veterinary inspection if any physiological attribute is suspect. Following inspection, there are two outcomes: passed or condemned. We had eight carcasses (0.27%) retained for veterinary inspection. Three of these eight (0.10% of total cattle) were condemned, resulting in a "0" value for hot carcass weight and no payment to the owner.

At the time of this study, the plant in which we worked did not have the capability to read EID tags. It would have been impossible to trace a carcass from an animal slaughtered on any given day back to the live animal without additional efforts of carcass data collectors. The various events that occurred on the kill floor and in the holding pens limited the amount of certainty with which an animal could be traced back, even to the lot of animal origin. This will often have little monetary impact to a producer, especially if there are no dropped or condemned carcasses in the lots immediately before and after a producer's lot. However, it would result in errors in matching carcass data to specific animals.

Results of this study are not intended to blame processors for impropriety. Neither do they excuse any inability to pay a producer on a grade and yield basis for the exact cattle delivered to the plant. The grand implication is that not all processing plants offer the same level of service. Some plants are very technologically adept and have a higher capacity for carcass traceability than others. Producers who intend to sell cattle on a grade and yield basis must take it upon themselves to become informed and learn the capabilities of the plant that will slaughter their cattle.