



Journal of Extension
www.joe.org

December 2012
Volume 50 Number 6
Article Number:
6RIB10

Impact of a Dairy Beef Quality Assurance Extension Program on Producer Cull Cow Management Practices and Meat Quality Knowledge

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Abstract: *Dairy producers must implement culling strategies that optimize animal welfare and meat quality to maintain consumer confidence in beef products. A Dairy Beef Quality Assurance Extension program was conducted including varying educational delivery methods, incorporating industry personnel in teaching and discussion, and interactive demonstrations. All respondents indicated that they would adopt at least one new production practice to optimize welfare and/or meat quality. Additionally, all*

respondents indicated that the workshop was effective at teaching producers how to optimize welfare and meat quality and improve the value of cull dairy cattle, suggesting that similar programs would be successful in other states.

Introduction

Cull cows and bulls account for approximately 15 to 20% of domestic beef slaughter, with about one-third being sourced from dairy cows (NCBA, 2007). Much of the beef derived from the slaughter of cull cows and bulls is used for the production of ground beef, which accounts for nearly 45% of the beef consumed in the United States (NCBA, 2007). However, beef processors will also market up to 75% of individual cull cow or bull carcasses as whole muscle cuts for roast beef, deli meats, fajita meat, or steaks and roasts at lower priced food service facilities (NCBA, 2007).

According to the 2007 National Market Cow and Bull Beef Quality Audit (NMCBBA), more cull dairy cows than cull beef cows had visible quality defects (37 vs. 28%) or displayed some level of lameness (49 vs. 16%; NCBA, 2007). These defects affect beef quality and can reduce animal welfare, both of which decrease value and consumer perceptions of the beef industry.

The greater incidence of defects observed in dairy cows compared to beef cows is a result of production and economic differences between these industries. The longevity of dairy cows within the herd is shorter than beef cows, partially because they are more intensively managed and reared on concrete. Accordingly, injury, reproductive inefficiency, low milk production, mastitis, and feet and leg issues are the primary factors for culling dairy cows (Hadley, Wolf, & Harsh, 2006); whereas beef cows are most often culled for reproductive inefficiency and poor calf weaning weights (Greer, Whitman, & Woodward, 1980). The income from the sale of cull animals historically accounts for only 5% of the income for dairies, but accounts for 15% of income for the average cow-calf operation (NDHIA, 2009), suggesting market cow quality could be more economically important in beef herds.

In February 2008, Hallmark/Westland Meat Packing Co. in Chino, California was required to recall over 143 million pounds of beef product. This was the largest recall and the only recall to date for a non-food safety concern ordered by the United States Department of Agriculture Food Safety Inspection Service (USDA-FSIS). The recall was prompted by the release of video footage displaying inhumane handling of non-ambulatory or "downer" dairy cows (USDA-FSIS, 2008). This event resulted in increased scrutiny on cull cow slaughter facilities and led to an enhanced policy on humane handling and slaughter set forth by FSIS in 2008 (USDA-FSIS, 2009).

The treatment these cows received at Hallmark/Westland was reprehensible. However, the most important question to ask was, "How did these dairy cows arrive at the slaughter facility in this condition?" Thin, sick and/or lame cows, some of which have multiple quality defects, are more likely to become "downers" during transport and marketing. Cattle arriving at slaughter facilities in compromised conditions can become "bad image" cattle when viewed in the public eye, which further decreases the public perception of beef production.

Dairy producers must implement management strategies for cull cows to optimize animal welfare and meat quality to maintain consumer confidence in beef products and avoid added regulation of industry practices.

The Beef Quality Assurance (BQA) and the Dairy BQA (DBQA) programs are overseen nationally by cattle and dairy producers via the National Cattlemen's Beef Association (NCBA) and are directed at the state-level by university Extension systems, state beef councils, and/or state cattlemen's associations (www.bqa.com). The Florida Beef Quality Producer Program is directed by University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS) Beef Extension specialists, and its mission is to strengthen consumer confidence in beef products by instilling sensible management practices to ensure beef's safety, wholesomeness, and quality (Thrift, Hersom, & Irsik, 2006).

Numerous authors have documented the educational impact of BQA Extension programs (Ahola & Glaze, 2009; Dalton, Moore, & Poe, 2007; Lardy, Garden-Robinson, Stoltenow, Marchello, & Lee, 2003). However, none of these programs included varying educational delivery methods, incorporating industry personnel in teaching and discussion, or interactive demonstrations.

Objectives of the Extension Program

- Measure the increase in knowledge and prospective behavior changes of dairy producers associated with an educational program focused on optimizing animal welfare and meat quality.
- Measure the impact of varying educational delivery methods, incorporating industry personnel in teaching and discussion, and interactive demonstrations on the knowledge gained by dairy producers.
- Develop a diagram of annual cow endpoints that use best management and monitoring practices and lead to timely marketing and prevent "bad image" cows.

Methods

A 2-day DBQA program was conducted with a total of 38 participants, representing approximately 25,000 dairy cows or 20% of the Florida dairy herd currently in production. Funding for this program was provided by the National Beef Checkoff program.

The material for the DBQA program was developed using the Best Management Practices (BMPs) within the Dairy Animal Care and Quality Assurance guide (NDHIA, 2009) and specifically targeted toward culling decision management. The format included lecture presentations from dairy, beef, and meat science faculty; interactive demonstrations; and panel discussions including university personnel, dairy producers, dairy veterinarians, beef processors, and cow procurement personnel.

Lecture presentations topics included:

- Culling factors
- Culling statistics and economics
- Results from the 2007 NMCBBA
- Factors affecting cull cow value
- Drug use and residue avoidance

Interactive demonstrations included:

- Live cow evaluation
- Carcass evaluation
- Carcass fabrication
- Discussion of carcass and wholesale value

The interactive demonstrations included three very different cows, representative of Florida cull dairy cows. Participants estimated live and carcass values, identified potential defects, and discussed animal welfare and public perception. Participants were then shown carcasses from previously slaughtered animals selected to be comparable to the three cows evaluated live.

Cows represented in the demonstration included:

- A "fat" cow culled for low milk production or reproductive inefficiency with a body condition score (BCS) of 5 (Scale 1-5; 1 = emaciated, 5 = obese; Figure 1)

Figure 1.

"Fat" Cow and Carcass



- A "target" cow culled for low milk production or reproductive inefficiency with no visible defects and a BCS of 3 (Scale 1-5; 1 = emaciated, 5 = obese; Figure 2)

Figure 2.

"Target" Cow and Carcass



- A "bad image" cow culled for poor health and/or lameness with multiple defects and a BCS of 1 (Scale 1-5; 1 = emaciated, 5 = obese; Figure 3)

Figure 3.

"Bad Image" Cow and Carcass



Panel discussions included:

- Handling, loading, and transportation of cows
- Options to rehabilitate potential "bad image" cows prior to transportation
- Fitness and stamina required for transportation
- Euthanasia and disposal of unmarketable cows

Attendees were divided into groups fabricating the three carcasses into wholesale cuts. The program ended with a thorough interactive discussion of the beef processor's net profit/loss from the wholesale yields of three carcasses fabricated.

At the conclusion of the program, participants were given a four page survey with six different components, The authors developed the inquiry to assess knowledge gained as described by (Kiernan, 2001b), the modified true-false questions as described by (Kiernan, 2001d), the ranking of topics of significance as described by (Kiernan, 2001c), the intentions for new production practices as described by (Kiernan, 2004), and the willingness to change as described by (Kiernan, 2001a), A total of 19 participants responded to the exit survey. The percentages reported were calculated by using the total number of respondents for each question as the denominator and the number of

respondents with a given answer as numerator \times 100. The survey was submitted for human subjects review at the University of Florida and was granted exemption status.

The six components included:

1. Learning Achieved Across Workshop Sessions.
 - Measured by asking participants to rate the level of knowledge gained in each session.
 - Possible answers were: "Nothing New, "Some New Knowledge, or "A Great Deal Learned."
2. Evaluation of Participant Knowledge of DBQA Principles.
 - Measured by eight content-related true/false questions addressed during the program.
3. Quantifying Participant Opinions.
 - Participants were provided with a list of seven topics addressed during the program, and were asked to rank the top three topics they felt they could help correct through improved management practices.
 - Topics included: "Herd Monitoring and Management, "Record Keeping and Animal Tracking, "Timely Marketing of Cows, "Humane Animal Handling and Transport, "Injection Site Management, "Residue Avoidance, or "Increasing Cull Cow Carcass Value."
4. Participant Willingness to Adopt New Production Practices.
 - Participants were asked to complete the question, "As a result of attending this extension program, I plan to implement _____ new production practices."
 - Possible answers were: "No, "One, "Two, or "Three or more."
5. Participant Willingness to Change Management Practices.
 - Participants were asked to answer, "How likely you were to implement specific management and marketing practices in your operation BEFORE the workshop and then how likely you will AFTER the workshop." Possible

answers were: "almost never, "sometimes, "often, or "always."

6. How effective was this extension program?

- This was measured by asking participants, "How effective was this workshop at teaching DBQA principles?" Possible answers were: "not effective, "somewhat effective, or "very effective."

Results

Knowledge Gained From the Individual Sessions

- Across all sessions, 88% of respondents indicated that they gained some degree of new knowledge, ranging from "a great deal learned" to "some new knowledge."
- The panel discussion sessions and the carcass evaluation and fabrication sessions were the only sessions that 100% of respondents indicated they gained at least "some new knowledge" or more.

Participant Knowledge of DBQA Principles

- The mean score for the eight true/false questions was 75%.

Quantifying Participants' Opinion of the Most Relevant Dairy Beef Issues

- Sixty-seven percent (67%) of respondents indicated that either "timely marketing of cows, "herd monitoring and management, or "increasing cull cow carcass value" was the most relevant issue that could be improved with management.

Willingness of Participants to Adopt New Production Practices

- One-hundred percent (100%) of respondents indicated that they would adopt at least one new production practice as a result of attending the workshop, with 29% of respondents indicating they would adopt three or more new practices.

Willingness of Participants to Change Five Management Practices (Table 1)

- Seventy-seven percent (77%) of respondents indicated that they would increase consideration of cull cow carcass value during culling by at least one level.
- Sixty percent (60%) of respondents indicated that they would more closely monitor cow BCS to aid in timely culling by at least one level, The remaining 40% of respondents closely monitor BCS often, regardless of the workshop.

- Thirty-nine percent (39%) of respondents indicated that they would reduce the frequency of marketing cows with a terminal condition or significant lameness by at least one level.
- Fifty-seven percent (57%) of respondents indicated that they would increase the frequency of properly administering animal health products to cows by at least one level. The remaining 43% of respondents either often or always properly administer products to cows, regardless of the workshop.
- Forty percent (40%) of respondents indicated that they would increase the frequency of only administering injections to cows within the neck by one level, Fifty-three percent (53%) of respondents either often or always only administer injections to cows within the neck, regardless of the workshop.

How Effective Was this Extension Program?

- One-hundred percent (100%) of respondents indicated that the workshop was effective teaching DBQA principles.

Table 1.

Willingness of Participants to Change Management

Management practice	Respondents	Percentage of respondents reporting a positive change after attending workshop			
		No change	One level	Two levels	Three levels
Increase consideration of cull cow carcass value during culling	13	23	69	8	0
More closely monitor cow Body Condition Score to aid in timely culling	15	40	47	13	0
Reduce the frequency of marketing cows with a terminal	13	61	31	8	0

condition or significant lameness					
Increase the frequency of properly administering animal health products to cows	14	43	50	7	0
Increase the frequency of only administering injections to cows within the neck	15	60	40	0	0

Discussion and Implications

The finding that the panel discussion sessions and the carcass evaluation and fabrication sessions were the most successful at increasing knowledge suggests the value of including varying educational delivery methods, incorporating industry personnel in teaching and discussion, and interactive demonstrations during Extension programs. The success of the discussion sessions displays the value of varying delivery methods and having interactive teaching and discussion including industry personnel to allow participants to gain real-world application and Extension personnel to include an academic perspective (Hall, McKinnon, Greiner, & Whittier, 2004). The success of the carcass evaluation session documents the value of interactive demonstrations and experiential learning activities (Hoover & Whitehead, 1975).

The mean score for the eight true/false questions suggests some level of proficiency was achieved with the DBQA concepts.

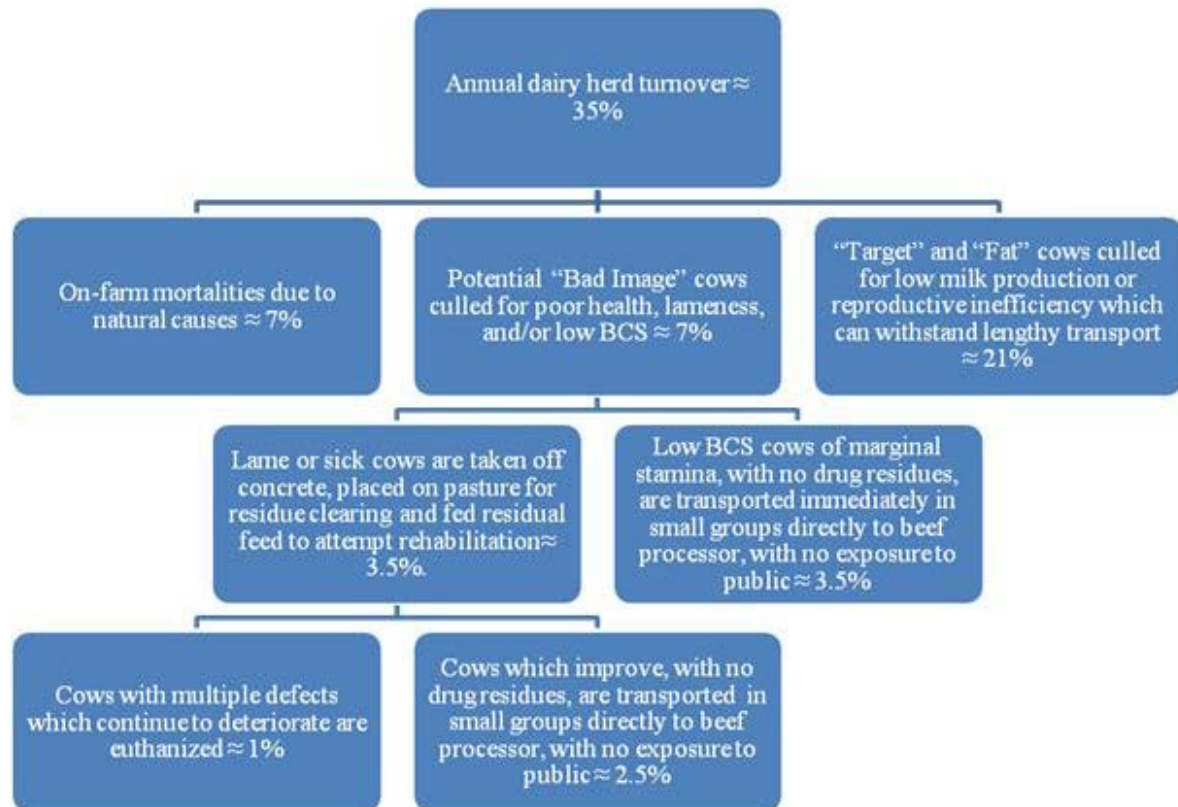
When attendees were asked what were the "most relevant dairy beef issues," two-thirds of attendees identified a portion of the second objective of the workshop, which was to "use best management and monitoring practices" to "lead to timely marketing." This suggests that most attendees had a clear understanding of the primary "take home message."

All respondents indicated that they would adopt at least one new production practice to optimize animal welfare and/or meat quality. Additionally, the program was effective at teaching producers how to optimize cow welfare and meat quality and improve value of cull dairy cattle, suggesting that similar programs would be successful in other states.

Finally, during the final panel discussion, a dairy producer panelist went to the chalkboard and drew Figure 4.

Figure 4.

A Diagram of Realistic Goals for Cow Endpoints Within Dairy Herds Annually



This figure is a diagram of BMPs to ensure dairy beef quality. It also serves as an example of varying teaching methods, collaborative discussions between industry and academic personnel, and the value of interactive teaching. Ultimately, this program serves as an excellent example of the UF/IFAS Extension mission to make agricultural knowledge accessible to sustain and enhance the quality of human life (<http://solutionsforyourlife.ufl.edu/about/>).

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