

Extension Education

406 Optimal dairy farm management subject to greenhouse gas emissions constraints. Di Liang*, Thomas F. Rutherford, and Victor E. Cabrera, *University of Wisconsin-Madison, Madison, WI.*

Dairy farm feed allocation decisions seek to maximize farm profit. We present a nonlinear programming model that chooses a robust policy among a set of dairy farm management strategies. In the optimal policy, animal feed may be produced or purchased to meet nutrition and production demands of cow groups in the herd. Nutrition requirements are calculated according to the National Research Council equations, production level, cow group, and lactation number. Farm-produced feed quantity and quality (e.g., total DM, CP, NDF, NE_L , RDP) are simulated with the Integrated Farm System Model using daily weather data. The quality of purchased feeds is established from published research. Based on these, milk sales, the farm-produced feed costs, purchased feed costs and the greenhouse gas emissions from manure and enteric fermentation are calculated. The optimal solution addresses the dual objective of maximizing profit (milk income over feed cost) while limiting greenhouse gas emissions. Farm characteristics (e.g., breed, production level, culling rate, reproductive performance, cropping strategy), feeding strategies (e.g., high or low forage, grazing, CP content, grouping strategy, seasonal diets which address heat stress), and manure management options (e.g., direct field application, lagoon, manure pile) provide detailed control of the dairy management strategies, which characterize an optimal policy. Consequently, the optimal solution provides a list of best feeding strategies and manure management practices according to farm-specific characteristics that maximize profit and minimize greenhouse gas emissions.

Key Words: profitability and environment, feed allocation, optimization modeling

407 A decision support tool for *Escherichia coli* bacterin mastitis vaccine use in dairy cows. Amanda E. Stone*, Tyler B. Mark, and Jeffrey M. Bewley, *University of Kentucky, Lexington, KY.*

The objective of this study was to create a producer-friendly decision support tool to evaluate the economic decision of implementing *Escherichia coli* (0111:B4) bacterin vaccination as a management practice. A partial budget analysis was conducted in Excel (Microsoft Corporation, Redmond, WA) and a producer-friendly dashboard was created (SAP America, Inc. Newtown Square, PA; the dashboard is available at <http://afsdairy.ca.uky.edu/J5MastitisVaccine>). Farm-specific inputs adjustable by the end user included herd size, milk price, milk yield, vaccine cost, labor cost, feed cost, culling rate from mastitis, coliform prevalence, replacement cow cost, and cull cow value. To demonstrate model sensitivity and utility, 3 example scenarios were evaluated. In all scenarios, vaccine cost was estimated at \$4.74 per cow and the rate of clinical mastitis in vaccinated cows was estimated at 8.6%. In the first scenario, a 100-cow herd was modeled with an average clinical mastitis prevalence (48%/year) and milk price (\$17.65, calculated from Food and Agricultural Policy Research Institute for years 2015 to 2025). In the second scenario, a 100-cow herd was modeled with an average clinical mastitis prevalence (48%/year) and greater than average milk price (\$25.70/cwt, calculated from years 2005 to 2015). In the third scenario, a 1,000 cow herd was modeled with an average clinical mastitis prevalence (48%/year) and average milk price (\$17.65/cwt). Labor costs, cull cow price, and replacement cow price were \$10/h, \$1,000/cow, and \$1,500/cow for all scenarios, respectively. The benefit:cost ratio of using a *Escherichia*

coli bacterin vaccine was \$7.52:\$1, \$8.51:\$1, and \$7.53:\$1, for scenarios 1, 2, and 3, respectively. The benefit was \$8,719/herd/year, \$11,552/herd/year, and \$87,191/herd/year, for scenarios 1, 2, and 3, respectively. All scenarios evaluated in this project were positive investments. Dairy producers considering investing in a coliform bacterin vaccine may use this as a decision support tool. This work was supported by a grant award from USDA-NIFA-AFRI (2013–68004–20424).

Key Words: economic dashboard, coliform mastitis vaccine, decision support tool

408 The Missouri Show-Me-Select Replacement Heifer Program: Improving heifer development practices and increasing technology utilization through economic incentives. Jordan M. Thomas*, Brianne E. Bishop, Jillian M. Abel, Jared E. Decker, Scott E. Pooch, Douglas S. Brown, Michael F. Smith, and David J. Patterson, *University of Missouri, Columbia, MO.*

The Show-Me-Select Heifer Program has resulted in improvements in development programs for replacement beef heifers and increased utilization of technology among participating beef operations across Missouri. Enrollment of heifers in the program has increased steadily in recent years, from 3,020 heifers enrolled in 2010 to 5,867 heifers in 2014. Enrolled heifers undergo a prebreeding evaluation that includes pelvic measurement and a reproductive tract score (RTS). Producers may elect to expose heifers for breeding via AI or natural service (NS), and the proportion of heifers exposed for AI service has increased steadily. In 2010, 68% of enrolled heifers were exposed for AI rather than serviced exclusively with NS; whereas, AI serviced heifers accounted for 91% of enrolled heifers in 2014. Use of ultrasound (US), as opposed to palpation per rectum for pregnancy diagnosis, has also increased in the program. In 2010, 59% of heifers were diagnosed for pregnancy using US, increasing to 72% of heifers in 2014. Use of US facilitates a more accurate determination of whether a pregnancy resulted from AI or NS and may also allow for determinations of fetal sex. Lastly, differences in average sale price among Show-Me-Select heifers indicate a growing awareness among buyers of the value associated with genetically elite females. Heifers meeting the minimum requirements for enrollment are classified as Tier 1. Heifers may be further distinguished as Tier 2 if the sire of the heifer meets minimum accuracy requirements for specified traits at the time of sale, including: calving ease direct, calving ease maternal, weaning weight, carcass weight, and marbling. From 2010 to 2014, Tier 2 heifers carrying AI sired pregnancies (\$2,279) sold on average for \$213 more per heifer than Tier 1 heifers carrying NS sired pregnancies (\$2,066). In summary, continued growth in the Show-Me-Select Heifer Program highlights the importance of economic incentives to drive technology utilization and improve heifer development practices statewide.

Key Words: heifer development, reproductive management, beef cattle

409 Engaging industry personnel in an agricultural education program. Angela R. Mays*, *F.L. Emmert Company, Cincinnati, OH.*

Typically inter-dependent departments usually exist within animal agricultural products businesses. Those personnel in billing, sales, maintenance, production and other areas may not have knowledge or understanding of end product usage in this industry. Consequently,

the F.L. Emmert Company recently initiated an agricultural education program, Emmert Educates, to engage and educate its employees. The program is voluntary, occurs once a month, and lasts for approximately one hour. Attendees are provided lunch, followed by a 10–15 min presentation, and then open discussion among the group. Supplemental printed materials and the opportunity for employees to suggest future topics have also been made available. A survey was recently conducted to evaluate the progress and staying power of the program, and allowed participants the opportunity to express themselves anonymously. The survey was conducted during the February 2015 Emmert Educates program and included all attendees, for a total of 10 participants. Of those surveyed, 100% were interested in the program continuing through 2015, with changes occurring in the frequency in which meetings are held. When asked if the program was informative and if the format was adequate 100% of those surveyed responded yes to both questions. Seventy percent of individuals surveyed did not feel as though the program interfered with their daily schedules, while 20% felt as though it did and 10% were unsure. The most impactful response came from the question addressing if employees had gained information from this program they would not have obtained elsewhere, with a 100% positive response rate. Therefore, the capability of the program to progress and evolve has been made available and confirmed through the positive responses from the survey. Overall, the ability to communicate and connect with employees through an agricultural education program has provided many benefits beyond the sharing of knowledge regarding this industry. Employees have been able to interact with one another in a work-free environment, learn from one another, and begin to understand their role as an employee in this industry, as well as a consumer of agricultural goods.

Key Words: education, industry, personnel

410 Using video for consumer attitude inoculation about beef animal slaughter. Katherine E. Powers and Traci L. Naile*, *Oklahoma State University, Stillwater, OK.*

In the face of increasing consumer demands for transparency in agricultural production, decreasing literacy about agriculture, and increasing needs for trustworthy information sources for consumers, methods of communicating information about agriculture need to be examined for their effectiveness. Specifically, concerns about beef cattle slaughter need to be addressed through creative and effective channels of communication. However, few studies have been conducted to determine whether consumers can be inoculated through specific mediums against negative messages about slaughter. As visual media platforms have been demonstrated to increase learning, this study was conducted to determine the success of video in educating consumers about the slaughter process. To accomplish this purpose, an online questionnaire was administered to control and treatment groups drawn from a population of university faculty and staff. Both groups responded to series of questions designed

to measure their attitudes toward beef consumption and beef cattle slaughter. The treatment group also watched a video of the humane beef cattle slaughter process immediately after answering the first series of questions, which was designed to capture attitudes about raising beef cattle for consumption. The American Meat Institute originally produced the video for the Glass Walls Project and permitted its use in this study. Consumers in the treatment and control groups had positive attitudes toward raising cattle for human consumption, humane beef cattle slaughter, education about slaughter, and consumption of beef. Consumers who viewed the video had significantly ($P < 0.05$) more positive attitudes about humane beef cattle slaughter, transparency about the slaughter process, and education about slaughter. These attitudes demonstrate that viewing a video of humane beef cattle slaughter is a successful method for educating consumers about the slaughter process. Using this method of communication is effective in inoculating consumers to negative messages that could influence consumers' attitudes about humane beef cattle slaughter.

Key Words: beef, slaughter, video

411 A high percentage of beef bull pictures in semen catalogs have obscured feet and legs. March K. Franks and Temple Grandin*, *Colorado State University, Fort Collins, CO.*

To assist semen buyers in evaluating conformation, bull photos should have fully visible feet and legs. A total of 1,379 beef bull pictures were surveyed to determine visibility of feet and legs from 4 American semen company websites. Five different breeds were represented: Angus, Red Angus, Hereford (polled and horned), Simmental, and Charolais. In addition to visibility, other variables were surveyed to establish frequencies and correlations. These included breed, color, material that obscured visibility such as grass, picture taken at livestock show or outside, semen company, photographer, video, age of bull, and semen price. A visibility score was given to each bull picture. The results showed that 19.4% of the pictures scored a visibility score of one, where the bull's feet and legs were fully visible. In the rest of the pictures, the bull's feet and legs were hidden to some degree, 42.9% hid the hooves (visibility score 2), 32.5% hid both the hooves and the dewclaws (visibility score 3), 1.5% covered the entire legs up to the brisket (visibility score 4); and 3.8% hid 2 feet or legs while the other 2 were fully visible (visibility score 5). Correlation (Spearman's test) between the bull's age and the first 4 visibility scores was statistically significant $P < 0.001$. As age increased the feet and legs were more likely to be visible in the bull's picture. Semen price and visibility score correlation was also statistically significant $P = 0.0143$. Higher semen cost was associated with higher percentage of pictures with hidden feet and lower legs. The results show that many bull semen catalog pictures need to have greater leg and foot visibility.

Key Words: bull, cattle, hoof