

Extension Education

T148 Utilization of fixed-time artificial insemination (TAI) to reduce breeding season length and its effects on subsequent calf value: A case study. Vitor R. G. Mercadante*, Darren D. Henry, Francine M. Ciriaco, Guilherme H. L. Marquezini, Tera E. Black, Kalyn M. Waters, Pedro L. P. Fontes, Nicolas DiLorenzo, and G. Cliff Lamb, *North Florida Research and Education Center, University of Florida, Marianna, FL.*

The development of TAI protocols has resulted in the opportunity for increased application of AI in commercial cattle operations. However, the long-term production and economic impact of implementing a TAI protocol in beef cattle operations has not been evaluated. Therefore, during an 8-yr period we evaluated the impacts of TAI to reduce the length of the breeding season (BS) and its effects on subsequent calving distribution, calf value, and BS pregnancy rates. The North Florida Research and Education Center consists of a beef herd containing 300 cows of Angus, Brangus, and Braford breed origin. During the 2006 and 2007 BS, the cows were exposed to a 120 d BS by natural service. In 2008, and every subsequent BS to 2013, all females were exposed to TAI using either the 5-d or 7-d CO-Synch+CIDR protocols. Initially, calving season length resulted in cows being inseminated in 3 TAI groups (in the 2008 and 2009 BS), subsequently reduced to 2 TAI groups (in the 2010 and 2011 BS), and eventually to a single TAI group (in the 2012 and 2013 BS). Following the initial TAI for each group, females were detected for estrus and inseminated artificially after an observed estrus until d 23 after TAI. On d 23 after TAI, bulls were introduced and cows were naturally mated for the remainder of the BS. All bulls passed a breeding soundness examination before being introduced to cows. The BS length was reduced from 120 to 70 d between the 2008 and 2013 BS. Calf distribution and subsequent weaning performance were determined. Overall pregnancy rates increased from 81% and 86% in the 2006 and 2007 BS, respectively, to 94% and 93% in 2012 and 2013, respectively. Mean calving date from the first calf born during each calving season was reduced from 80.9 d from the 2007 BS to 38.9 d from the 2013 BS. Utilizing a similar calf value across years of \$0.91/kg, the mean value per calf increased by \$87 per calf resulting from the 2008 BS to \$169 per calf resulting from the 2013 BS. We conclude that exposing beef females to TAI and reducing the BS length for 6 years altered calving distribution, increased breeding season pregnancy rates, and increased calf value.

Key Words: fixed-time artificial insemination, economics, calving distribution

T149 Silage safety issues for large-scale bunker silos and drive-over piles: Avalanches. Ruth E. Bolsen and Keith K. Bolsen*, *Kansas State University, Manhattan, KS.*

Few farming operations invite as many different opportunities for injury or fatality as a silage program. One of these is an avalanche or collapsing silage. It only takes a fraction of a second for part of a silage face to silently break off and fall, and the result can be deadly for anyone located beneath it. Two silage avalanche tragedies are documented and 5 common sense ways they can be avoided are presented. In October 2013, Matthew Winkelbauer was buried in a silage avalanche on a feedlot near Norfolk, Nebraska. Winkelbauer, who owned the feedlot, was pronounced dead at the scene. He was standing in front of the feedout face, which was about 4 m tall, and the avalanche pushed the falling silage more than twice that distance from the face. In January

2014, Jason Leadingham, a silage haul-back driver, was working alone in a bunker silo near Roswell, New Mexico, when 10 to 15 tons of corn silage collapsed on him. Leadingham's body was not recovered from the silage until 2 h later, and the cause of his death was mechanical asphyxia. Many bunkers and piles are too large to be safe for the crew filling them and the one feeding the silage out. Common sense tells us that a 6-m-tall silage face is far more dangerous than one that is only 3 m tall. Here are guidelines that can decrease the chance of having a fatality or serious accident caused by a silage avalanche: (1) Never allow people to stand near the feedout face, (2) a rule-of-thumb is never stand closer to the feeding face than 3 times its height, (3) suffocation is a primary concern and a likely cause of death in any silage avalanche, so follow the "buddy rule" and never work alone in a bunker or pile, (4) post warning signs, "Danger! Silage Face Might Collapse", around the perimeter of bunkers and piles, and (5) avoid being complacent and never think that an avalanche cannot happen to you. We cannot stop avalanches from happening, and they are impossible to predict, but we can prevent people from being under them. Every feedlot and dairy should have safety policies and procedures for their silage program, and they should schedule regular meetings with all their employees to discuss safety.

Key Words: silage, avalanche, fatality

T150 Production system characteristics related to technology transfer facility to improve milk quality of small dairy farms.

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The milk production by small-scale farmers has great importance in Brazilian agribusiness, however this sector is deficient in terms of technology to ensure minimum quality standards. Many aspects are needed to achieve these quality criteria, but among these, an important factor is the transfer of technology through technical assistance programs. The study was conducted in State of São Paulo, Brazil, and had the objective of identify the characteristic of small-scale dairy farms that are related to technology transfer facility to improve milk quality. During 12 mo, 60 farms were monitored for milk composition, somatic cell count and total bacterial count, and received technical assistance. At the beginning of the study, the producers were interviewed with the use of a semi-structured questionnaire. After 12 mo, the farms were divided into 2 groups: greater improvement and lesser improvement of milk quality, and a multiple correspondence analysis was performed to identify the characteristics that differentiate the groups. The results show that properties had average herd of 38 cattle, 180 L/d milk, total area of 30 ha and use of direct family manpower. Multivariate analysis enabled to identify some characteristics that helped in improvement of milk quality. The group with greater improvement used artificial insemination without technical advice with the choice of bulls, were in quality-based payment programs, used formulated diets with no silage. These characteristics were evaluated at the beginning of the study, and altered according to the needs of each property, resulting in improvement of milk quality. The changes suggested by the extensionists in nutrition, mastitis control, and milking hygiene had great importance, however the participation of quality-based payment programs had the greatest impact on improvement of milk quality. These information are useful and could help to develop and guide technical assistance

programs and the transfer of technology to small-scale milk producers. Financial support: FAPESP.

Key Words: extension program, milk production, small-scale dairy farming

T151 Participation in the 2015 Margin Protection Program by Idaho dairy producers.

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A mail-in survey was conducted to evaluate participation in the Margin Protection Program (MPP) and to gather producer input for future MPP education. The survey was mailed to every registered dairy in Idaho (n = 515) and 107 surveys were returned (20.7% response rate). Survey data were compared with Proc GLM and Proc Freq in SAS (SAS Inst. Inc., Cary, NC). Dairies were categorized by annual milk sales: small (<1,814 tonnes, 40.2%), medium (1,814 to 5,443 tonnes, 23.3%), large (5,444 to 11,399 tonnes, 19.6%) or very large (>11,399 tonnes, 16.8%). Eighty-two percent of respondents described their MPP knowledge as moderate to very high and their decision to participate as not difficult to somewhat difficult. On-line MPP decision tools were used by 30% of respondents and 28% calculated an average historical margin basis (herd margin - MPP margin) for their dairy. Sixty-eight percent of respondents elected to participate in MPP and 31 out of 73 elected to buy up coverage over basic (\$4.00/45 kg). Participation rate was greater ($P < 0.01$) for dairies producing >11,399 tonnes but the percentage of producers buying up coverage was higher ($P < 0.01$) for those producing <5,443 tonnes. The overall mean margin and coverage rate were $\$5.03 \pm 0.16$ and $84 \pm 2\%$, respectively, and averaged $\$6.42 \pm 0.16$ and $76 \pm 4\%$ for those purchasing higher coverage. Mean buy up coverage was similar ($P > 0.20$) between herd size categories. Producers indicated an interest in learning how to calculate and interpret margin basis plus training on how to use and interpret the on-line MPP decision tools. Producers preferred future MPP training with the following methods: producer meetings ($76 \pm 4\%$), newsletters ($70 \pm 4\%$), magazine articles ($60 \pm 4\%$), web based materials ($48 \pm 4\%$), and webinars ($24 \pm 4\%$). Preference for educational method did not differ between herd size categories ($P > 0.25$). We conclude that the MPP is an important management tool for Idaho dairy producers and further MPP training is desired by the industry.

Key Words: Margin Protection Program, risk management

T152 Comparing lying behaviors on commercial Croatian dairy farms.

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Lying behavior can be a useful tool for evaluating the suitability of dairy cows' housing environment. The objective of this study was to evaluate the lying behavior of high-producing Holstein dairy cows on commercial Croatian farms with different management systems. Data were collected from 303 dairy cows across 4 farms in eastern Croatia for at least 3 d. There were some general differences in farm management. One farm used bedded pack housing and a parallel parlor (BP), one used older freestalls (>30 yrs. old) and a herringbone parlor (FH), one was a forced-traffic robotic farm with freestalls (FRb), and one used new freestalls (built in 2013) and a rotary parlor (FRt). Behaviors (lying times (min/d), lying bout duration (min/bout), lying bouts (n/d) and laterality of lying) were recorded by dataloggers recording at 1-min intervals. Acceleration data were summarized into lying behaviors for

each individual cow using SAS (v9.3) and the MIXED procedure was used to determine differences in lying behavior across farms. Lying times differed ($P < 0.001$) with values ranging from (farm mean \pm SE) 735.1 ± 17.2 (BP) to 623.7 ± 22.8 (FRb) min/d. Lying duration values ranged from 95.7 ± 5.2 (FH) to 60.1 ± 5.4 (FRt) min/bout, differing across farms ($P < 0.01$). Lying bouts differed ($P < 0.001$) with values from 13.4 ± 0.4 (FRt) to 9.1 ± 0.6 (FRb) n/d. Right side lying duration differed ($P < 0.001$) with values from 87.7 ± 3.9 (FH) to 58.1 ± 4.1 min/bout (FRt). Right side lying bouts ranged from 6.7 ± 0.3 (FRt) 4.1 ± 0.3 (FH) n/d and differed ($P < 0.001$). Left side lying times differed ($P = 0.01$) ranging from 381.1 ± 15.8 (BP) to 291.7 ± 21.1 (FRb) min/d. Left side lying duration ranging from 92.3 ± 5.7 (FH) to 63.3 ± 6.0 (FRt) min/bout differed ($P = 0.006$). Left side lying bouts differed ($P < 0.001$) ranging from 6.7 ± 0.3 (FRt) to 4.5 ± 0.5 (FRb) n/d. BP had longer daily lying times than any of the farms with freestalls suggesting greater cow comfort. FRt had more lying bouts per day and the shortest lying durations suggesting reduced comfort. These data suggest there may be differences among farm systems to be addressed when developing standards for cow comfort.

Key Words: lying behavior, dairy cow, dairy management

T153 A demonstration on the use of small ruminants for unwanted vegetation management.

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The practice of using small ruminants to manage unwanted vegetation (noxious weeds, invasive species, weeds, etc.) is considered an environment favorable practice. Sheep and goats have a small environmental footprint and combined with their size and maneuverability allure their use as tools to manage unwanted vegetation. The main objective of this extension demonstration project was to develop a module with multiple components to propose solutions for management of unwanted vegetation using sheep and goats on Delmarva. During the spring and summer of 2014, 2 groups of sheep and goats were selected to be part of a vegetation management demonstration at the University of Maryland Eastern Shore. The animals were confined using cattle panels and steel posts to 2 main targeted areas. Area 1 consisted of 2 drain canal sites with a total area of 2160.24 m² and contained mixed understory, predominantly multiflora rose (*Rosa multiflora*). Area 2 consisted of steep banks in 2 lagoons with a combined target area of 1,670.97 m². The vegetation was predominantly horseweed (*Coniza canadensis*). To estimate dry matter available for consumption, vegetation samples were collected from random sites (1 m²). The collected samples were weighed, air-dried and sent to a laboratory for analysis. The vegetation's total digestible nutrients for the ditch and lagoon locations were 54.25% and 51.40%, respectively. Percent protein was higher in Area 1 than the lagoon location, 9.25% and 4.98%, respectively. Acid detergent fiber percentage was similar, 45.90% for the canals and 45.98% for the lagoon banks. In Area 1 there were 419.3 kg Dry Matter (DM) available for consumption and 1019.3 kg DM on Area 2. The results obtained showed that in Area 1 it took 29 d to obtain an average disappearance of unwanted vegetation of 83% using 10 does and 10 ewes (average BW 35.6 kg). While in Area 2, it took 40 sheep and goat wethers (average BW 41.3 kg) 28 d remove 95% of unwanted vegetation. The measurement of vegetation disappearance is a key component for

future studies to estimate the number of sheep and goats necessary to manage vegetation in targeted areas.

Key Words: unwanted vegetation, small ruminant, environmental impact

T154 Bedding characteristics are associated with milk quality in Illinois dairy farms: A Dairy Focus Team approach. Maria I. Rivelli*¹, Katie J. Haerr¹, Sarah Y. Morrison¹, Saige A. Sulzberger¹, Cassandra S. Skenandore¹, Leo L. Timms², and Felipe C. Cardoso¹, ¹University of Illinois, Urbana, IL, ²Iowa State University, Ames, IA.

The ultimate goal of this project is to improve Illinois dairy farms through education, accomplished through the science based innovation of the University of Illinois research and extension. The specific aim of this study was to investigate the association between bedding material and milk quality of dairy cows. Twenty dairy farms in Illinois located in the central (C), north (N), and south (S) regions were visited. During the visits, a questionnaire, DHI records along with the individual farm data set (PCDART or DAIRYCOMP305) were collected and a final data set with the combined information was built in excel for analysis. Cow's bedding sample was a composite sample made from 3 different spots in the bed (front, center, and back). Bedding quality was evaluated by quantifying dry matter (DM) percentage, organic matter (OM) percentage, and particle size (PS). Dry matter analysis was performed in all types of bedding; OM and PS analyses were performed only in sand bedded farms (n = 12). Three replications for each sample were performed for PS to obtain particle size (μm), standard deviation, and particles per gram (p/g). Statistical analysis was performed using the UNIVARIATE and GLM procedures of SAS (v9.4). Sixteen farms (80%) used sand bedding; 32% of those farms combined sand with a different type of bedding such as straw or compost. Among the other 4 farms (20%), there were 2 farms (10%) with straw bedding, 1 farm (5%) was using sawdust, and only one farm (5%) had their cows on pasture. Differences for DM and OM were found between and within regions. On average the 12 farms that used sand as bedding had a $92 \pm 8\%$ of DM, $3 \pm 2.7\%$ of OM, milk yield per cow/d was $35.17 \pm 6\text{kg}$, and somatic cell count (SCC) tank was 204 ± 91 cells/mL. However there was a linear correlation ($P = 0.05$, $R^2 = 0.32$, $\text{SCC} = 16.28\text{OM} + 134.1$) between OM and SCC, and no correlation ($P = 0.3827$) between DM and SCC, Southern IL had lower DM (88.4 ± 9) and OM (1.9 ± 0.8) percentage and higher somatic cell count (261.2 ± 179) than N or C. In conclusion, our results confirm the premise that farms with high OM bedding are associated with higher milk tank SCC.

Key Words: sand, bed, organic matter

T155 On-farm field days as a tool to demonstrate and educate about dairy waste management practices. Mario E. de Haro-Marti*¹, Mireille Chahine², Lide Chen², and Howard W. Neibling³, ¹University of Idaho, Gooding, ID, ²University of Idaho, Twin Falls, ID, ³University of Idaho, Kimberly, ID.

Teaching best management practices (BMP) or introducing new agricultural waste management practices to dairy producers and crop farmers is a challenge. A series of on-farm field days were designed to deliver information and demonstrate several waste management techniques. During these field days, extension personnel presented each technique and offered written information on how to apply them. Presentations by the livestock producers and farmers who are already applying the techniques and hosted each field day at their farms were a powerful tool to spark interest and conversations with attendees. Five field days

were delivered in 2012 and 2013. The objectives were to demonstrate techniques aimed to reduce ammonia, greenhouse gases, and odor emissions, increase nitrogen retention from manure, reduce run-off risks, manage mortalities, and generate usable by-products from livestock and other agricultural wastes. Topics addressed on each field day were (a) dairy manure collection and composting; (b) dairy slurry manure land application using a drag hose and injection system; (c) two field days on grape vine prunings and dairy manure composting; (d) mortality and offal on-farm composting at a sheep and goat dairy farm. A total of 142 individuals attended the field days. In all cases, farm owners and their managers presented and were available to answer attendees' questions, sharing their experience, and opinions regarding the demonstrated practices. Many attendees expressed their interest and willingness to adopt some of the demonstrated practices. On-farm field days are an excellent tool to increase understanding and adoption of BMP and new technologies. Hearing experiences first hand from producers applying the techniques and being able to see them in action are excellent outreach tools. On-farm field days also fit the fast pace, busy schedule of modern producers who can later visit with extension, industry, and other institutions personnel if they need more details, information, and help on how to adopt the techniques they are interested in.

Key Words: extension, field day

T156 Reproductive performance in dairy farms throughout Illinois: A Dairy Focus Team approach. Maria I. Rivelli*¹, Tonja Egan¹, Diego A. Velasco Acosta^{1,2}, Katie J. Haerr¹, Sarah Y. Morrison¹, Saige A. Sulzberger¹, Cassandra S. Skenandore¹, and Felipe C. Cardoso¹, ¹University of Illinois, Urbana, IL, ²Universidade Federal de Pelotas, Pelotas, Brazil.

The ultimate goal of this project is to improve Illinois dairy farms through education. This is accomplished through the science-based innovation of the University of Illinois research and extension, and also gives students hands-on experience evaluating commercial dairy farms. Fertility in dairy cows has been declining in recent years. Therefore, the specific aim of this study was to survey the association between milk yield and reproductive status of dairy cows in selected dairy farms in Illinois. Twenty dairy farms in Illinois located in the central (C), north (N), and south (S) regions were visited. During the visits, a questionnaire, DHI records along with the individual farm data set (PCDART or DAIRYCOMP305) were collected and a final data set with the combined information was built in Excel for analysis. Yearly pregnancy rates (PR), first service conception rate (FSC), and services per conception (SC) were assessed on cows and heifers from 12 farms. Statistical analysis was performed using the UNIVARIATE procedure in SAS (v9.4). Heifer's PR average overall was $14 \pm 8.4\%$, and cow's PR was $16.7 \pm 4.9\%$. As expected, FSC was higher for heifers ($56.5 \pm 16.5\%$) than cows ($40.8 \pm 9.0\%$). Heifer's SC was 2.2 ± 1.4 , and cow's was 2.6 ± 0.6 , and average milk yield per cow/d was $35.3 \pm 6.1\text{kg}$. In Northern Illinois, heifer's PR was higher ($20.2 \pm 4.3\%$) than Central Illinois ($13.5 \pm 8\%$). Furthermore, in Northern Illinois cow's PR was higher ($19.2 \pm 4.9\%$) than Central Illinois ($17.7 \pm 2.6\%$). Moreover, similar differences were found for FSC, and SC. Average milk yield per cow/d was $38.0 \pm 6.6\text{kg}$ for N; $32.9 \pm 5.6\text{kg}$ for C; and $36.2 \pm 6.4\text{kg}$ for S. In conclusion, there were differences for PR, FSC, and SC percentages between and within regions. These results collectively, although limited in sample size, suggest that geographical aspects may play a role in reproductive success in Illinois dairy farms. The results of this study would imply customized recommendations to each farm to improve its reproductive status.

Key Words: reproductive success, Illinois, pregnancy rate

T157 Evaluation of seed corn hybrids to provide nutrients that are highly digestible for South Dakota livestock operations. David P. Casper*, Sara Sontag, Laura McMartin, William Weich, and Jonathan Kleinjan, *South Dakota State University, Brookings, SD.*

South Dakota cropping operations are historically well known historically, as is the SD State University (SDSU) Crop Performance Testing (CPT) program, for focusing on grain production. Recent expansion of the SD dairy industry has created interest in selecting the right seed hybrid for either corn silage and/or grain production. A unique SDSU relationship developed to expand the CPT program to evaluate hybrids for forage production and quality. This information will be crucial for the Interstate-29 SD dairy industry to compete globally. In the 2013 growing season, 45 grain hybrids were evaluated for both corn silage and grain. Hybrids were planted in 4 row field test plots at the SDSU Volga research farm. Corn plants from the center rows were hand harvested at a min of 15 cm from the ground. The plants were weighed, chopped (chipper/shredder), inoculated with Silo King (0.55 kg/ton), packed in

duplicate 18.9 L buckets, sealed, weighed, and allowed to ensile for >90 d at which time, buckets were weighed, opened, and samples submitted for measurement of nutrient concentrations and digestibility (Analab Inc.). In the 2014 growing season, 31 silage specific silage hybrids were evaluated. Procedures were the same, except buckets were opened at 60 and 90 d. In the 2013, the grain hybrids were drier at harvest (range: 28.7 – 56.5; mean = $39.1 \pm 3.21\%$ DM), compared with 2014 hybrids being wetter (range: 21.8 - 39.6; mean = $29.9 \pm 2.62\%$ DM). For the 2013, the hybrids varied in digestible DM (range: 60.6 – 74.3; mean = $69.8 \pm 3.21\%$ DM), while 2014 hybrids were (range: 65.4 – 72.5; mean = $69.6 \pm 2.54\%$) were less variable. The 2014 DM silage yield (range: 18.4 - 23.8; mean = 20.2 ± 2.51 t/ha) varied dramatically, while digestible DM yield (range: 12.4 - 16.8; mean = 14.1 ± 2.02 t/ha) varied as well. Selecting the appropriate seed corn hybrid can improve corn silage yield and digestibility, thereby the right hybrid being able to meet a great percentage of the nutrient requirements of the lactating dairy cow.

Key Words: hybrid, corn silage, forage