

can increase BW and body condition in first calf heifers and decrease SUN concentrations in both first calf heifers and mature cows in open rangeland conditions of the desert southwest.

**Key Words:** Beef cattle, Early weaning, Parity

## Production, Management, and the Environment

**W212 Serum progesterone in cycling ewes treated with progesterone-impregnated intravaginal inserts on the day of estrus.** J. L. Duffey\*, D. M. Hallford, C. A. Gifford, and R. L. Rosencrans, *New Mexico State University, Las Cruces, NM/USA.*

Progesterone-impregnated intravaginal inserts (CIDR) can synchronize estrus in ewes but conception may be reduced. This study compared progesterone (P4) profiles in cycling Rambouillet ewes (control, n = 10) with those in cycling ewes (n = 10) receiving a CIDR (0.3 g P4, Pharmacia and Upjohn Ltd. Co., Auckland, NZ) on the day of estrus (d 0) and ovariectomized (OVX, n = 6) ewes treated with a CIDR. The CIDR's were removed after 14 d; intact ewes were then placed with raddled rams during a 21-d breeding season. Ewe BW were similar (P = 0.68) among groups averaging 74 ± 3 kg and serum P4 was less than 1ng/mL on d 0 in all ewes. On d 1, serum P4 differed in controls and in CIDR-treated intact and OVX ewes (0.2 < 2.9 < 4.4 ± 0.3 ng/mL, respectively; P < 0.01). On d 3, control ewes had a P4 concentration of 0.8 ng/mL (P < 0.01) compared with 3.4 ± 0.2 ng/mL in CIDR-treated intact and OVX ewes. This similarity in P4 value in the two CIDR treatments (P > 0.10) continued through d 7 at which time ewes in all three groups averaged approximately 4 ng/mL. Serum P4 in control ewes rose during the luteal phase to peak at 6.4 ± 0.5 ng/mL on d 12 and was greater (P < 0.01) on d 12 through 14 than values in both CIDR-treated groups. However, serum P4 was similar (P > 0.10) in CIDR-treated intact and OVX ewes from d 12 to 14 (2.8 and 1.9 ± 0.5 ng/mL, respectively, on d 14). Serum P4 averaged 6.2 ± 0.7 ng/mL in controls (P < 0.01) compared with 0.3 and 0.2 ng/mL in the two CIDR-treated groups on the day after CIDR removal. Control ewes were marked by rams on an average of d 17.9 compared with d 15.5 (± 0.4) for CIDR-treated intact ewes (P < 0.01). Ten percent of control ewes were marked by rams at a subsequent cycle compared with 60% of CIDR-treated intact ewes (P = 0.02). Results demonstrate that intact cycling ewes produce more P4 during the mid and late luteal phases than that released by the CIDR. The observation that ewes receiving a CIDR on d 0 have the same P4 on d 12 to 14 as CIDR-treated OVX ewes suggests premature demise of the corpus luteum which may have influenced the poor conception rate. (Thanks to Meg Oeller, DVM, CVM, FDA for INAD 10-321)

**Key Words:** Sheep, CIDR, Synchronize

**W213 Progesterone release and clearance patterns of progesterone-impregnated intravaginal inserts in ewes.** C. A. Gifford\*, J. L. Duffey, R. L. Rosencrans, and D. M. Hallford, *New Mexico State University, Las Cruces, NM/USA.*

Six ovariectomized Rambouillet ewes (BW = 73 ± 4 kg) were utilized to determine progesterone (P4) uptake and clearance patterns after insertion and removal of P4 containing controlled internal drug releasing devices (CIDR, 0.3 g P4, Pharmacia and Upjohn LTD. Co., Auckland, NZ). Animals were maintained in a single pen (12 x 4 m) under ambient conditions with access to shade, water, salt, and alfalfa hay (2 kg/d). In period 1, serum was collected before and hourly for 12 h after CIDR insertion. Serum P4 concentration was 4.7 ± 0.6 ng/mL 1 h after CIDR insertion compared with 0.1 ng/mL (P < 0.01) immediately before CIDR insertion on d 0. Serum P4 peaked at 6.3 ± 0.6 ng/mL (h 4) and remained elevated for the remaining 12 h on d 0. Additional samples were collected daily for 14 d in period 1, and all P4 values were 2 ng/mL or greater. Each CIDR was removed on d 14, and serum was collected intensively for 12 h after CIDR removal. At 15 min after CIDR removal, serum P4 was 1.2 compared with 1.9 (± 0.1) ng/mL before removal. At 1 and 2 h after CIDR removal, serum P4 values averaged 0.8 and 0.7 (± 0.1) ng/mL, respectively; and 12 h after CIDR removal, P4 had declined to 0.2 ng/mL. After 2 wk, the same CIDR was reinserted in the same ewe from period 1 for second and third 14-d periods. Daily P4 concentrations were compared to determine the efficiency of using a CIDR multiple times. Serum P4 averaged 4.4, 2.1, and 0.7 (± 0.4) ng/mL on d 1 of periods 1, 2, and 3, respectively (P < 0.01). On d 7, period 1 P4 value was 3.6 ng/mL compared with 1.5 and 0.3 (±

0.3) ng/mL during periods 2 and 3, respectively (P < 0.01). Serum P4 was < 1 ng/mL after d 9 of period 2 and never averaged greater than 0.7 ng/mL during period 3. On d 14, P4 values were 1.9, 0.7, and 0.3 (± 0.2) ng/mL in the three respective periods. Results show that P4 from the CIDR rapidly enters the circulation (within 1 h) at the time of insertion and is rapidly cleared after CIDR removal (< 1ng/mL by 1 h). Also after 2, 15-d periods in situ, CIDR's were no longer able to increase serum P4 concentrations. (Thanks to Meg Oeller, DVM, CVM, FDA for INAD 10-321)

**Key Words:** Sheep, CIDR, Synchronize

**W214 Effects of seminal traits and mating behavior on number of progeny sired in multi-sire herds.** W. A. Whitworth<sup>1</sup>, D. W. Forrest\*<sup>1</sup>, L. R. Spratt<sup>1</sup>, B. G. Warrington<sup>2</sup>, and J. W. Holloway<sup>2</sup>, <sup>1</sup>*Department of Animal Science, Texas A&M University, College Station,* <sup>2</sup>*Texas Agricultural Experiment Station, Uvalde.*

Effects of serving capacity (SC), social dominance rank (SDR) and physical characteristics of bulls on reproductive performance in multi-sire herds were evaluated. Spermatozoal traits and presence of fertility-associated antigen (FAA) were also assessed. In experiment one, Braunvieh (n=6) and Bonsmara (n=6) bulls (18-24 mo of age) were evaluated for body condition score (BCS), SDR, SC, sperm motility and morphology, and FAA status (positive/negative). Bulls were joined with multiparous cows (n=305) for 90 d. Paternity was verified by DNA typing of 251 calves. Regression analyses were used to determine traits associated with variability in number of calves sired per bull. Chi square analyses were used to determine effects of morphology and FAA status on numbers of calves born early (<41 d) or late. All bulls were FAA-positive and more calves were sired by Braunvieh (P<0.05) bulls. Bull breed, motility, morphology, and SDR rank were positively associated with variability in number of calves sired per bull (P<0.05, R-square = 0.75). Bulls with >80% normal sperm sired more calves early in the calving season (P<0.05). In experiment two, Bonsmara (n=6, 13-14 mo of age), Tuli (n=6, 15-18 mo of age), and Waygu (n=6, 18-19 mo of age) bulls were evaluated as in experiment one, along with BW, scrotal size and service efficiency (ratio of mounts to services). Bulls were joined with multiparous cows (n=290) for 90 d. Sire was determined for male calves (n=125). More calves were sired by older (Waygu) bulls (P<0.05). Age of bull, FAA-status, and BW explained variation in number of calves sired per bull (P<0.01, R-square = 0.64). There was a linear relationship (P<0.05) between service efficiency and number of calves sired per bull. Assessment of FAA status of sperm, SDR, and service efficiency in conjunction with a breeding soundness exam will identify bulls that can potentially sire increased numbers of early-born calves.

**Key Words:** Beef cattle, Bull fertility

**W215 Effects of an injectable trace mineral supplement on conception rate of lactating dairy cows.** J. A. Vanegas\*, J. Reynolds, and R. Atwill, *University of California, Davis. Veterinary Medicine Teaching and Research Center, Tulare CA.*

A total of 830 dairy cows from a commercial dairy farm located in central California were used to evaluate the effects of a single or double dose of a trace mineral supplement (Multimin<sup>®</sup>) on first service conception rate. Cows were randomly allocated into treatment or control group to either a single (Experiment 1) or a double dose regime (Experiment 2). Allocation was based on days on lactation for the Experiment 1 and the length of their gestation period for Experiment 2. In Experiment 1, cows between 38 to 45 days in lactation (TREATMENT 1 n=191) received a single injection of 5ml of Multimin<sup>®</sup>. Two hundred and twenty eight similar cows were used as a CONTROL 1. In Experiment 2, cows received an initial injection of 5ml of Multimin<sup>®</sup> between 2 to 3 wks pre-calving (TREATMENT 2 n=186). An equal dose was repeated between 38 to 45 days in lactation. Two hundred and twenty eight similar cows

served as a CONTROL 2. Health and reproductive events post calving such as retained placenta and mastitis were recorded. The odds of first service conception for cows and heifers experiencing retained placenta and mastitis prior to first artificial insemination were significantly lower compare with their controls (OR 0.44 to 0.52, P-value 0.01). In Experiment 1, the odds of first service conception were not significantly different for cows and heifers given the one dose regimen of Multimin<sup>®</sup> compared to their untreated controls (OR 0.94, P-value=0.63). In Experiment 2, the odds of first-service conception were significantly lower for cows and heifers given the two-dose regime of Multimin<sup>®</sup> compared to their untreated controls. (OR 0.66, P-value=0.002). No significant differences on first-service conception were found between cows and heifers given the two-dose compared to the one-dose regime of Multimin<sup>®</sup> (OR 1.17, P-value=0.51)

**Key Words:** Conception rates, Trace minerals, Multimin

**W216 Techniques for measuring carcass attributes in live cattle with ultrasound.** J. R. Brethour\*, *KSU Agricultural Research Center - Hays.*

The ubiquitous use of ultrasound in evaluating carcass traits in cattle can be enhanced with convenient and accurate procedures for estimating backfat, longissimus area, and intramuscular fat. It was found that a 5 MHz transrectal transducer (Aloka) provided more accurate measures of backfat over the region of the 12th and 13th rib with a sagittal than a transverse scan with average absolute errors of 1.6 and 2.2 mm, respectively. R<sup>2</sup> values were similar (.70 and .69 - 146 cattle) but the bias was less with the sagittal orientation (1.4 vs 2.1 mm). Longissimus area was estimated from the muscle depth or the distance from the bottom of the backfat to the features representing the transverse processes at the first and second lumbar. In a set of 139 cattle the correlation between this measure and carcass longissimus area was .67. Because this measure is commonly expressed in English measure an equation was developed for technician use (REA = muscle depth in mm/ 4 minus 1). This had an average error of 6.26 cm<sup>2</sup> (.97 in<sup>2</sup> and a bias of 1.9 cm<sup>2</sup>). The procedure can be executed using the electronic calipers on most ultrasound instruments although algorithms for these measures on a digitized image were used. Ultrasound technicians should become proficient at estimating percent intramuscular fat from visual interpretation of images. The transverse image between the 12th and 13th ribs was viewed and the amount of ultrasonic speckle plus using the rib bone and spinous processes as densitometers to estimate beam attenuation were considered in making estimates. Results of the accuracy of the visual estimates to predict carcass marbling were compared to computer interpretations of the image using validated programs. Results expressed as R<sup>2</sup> values (n = 42) were .65, .57, .58 and .53 for the visual estimates (using a 12 cm 3.5 MHz transducer) and computer estimates for a 12 cm 3.5 MHz, 17 cm, 3.5 MHz, and a 5 MHz transrectal transducer, respectively. Respective absolute errors were .49, .52, .48 and .44 marbling score units. These results should assist ultrasound technicians to perform rapid evaluations where interpretation software is not available.

**Key Words:** Ultrasound, Cattle, Carcass

**W217 Effect of a birth weight selection index on Hereford calves from inbred and outcross matings.** D. C. Anderson\*<sup>1</sup>, D. D. Kress<sup>2</sup>, and K. C. Davis<sup>2</sup>, <sup>1</sup>*Northern Agricultural Research Center, Havre,* <sup>2</sup>*Montana State University, Bozeman.*

The effect on calf performance and proportion assisted births from selecting linebred (LB) or outcross (OC) sires based on a birth weight selection index (SI) was evaluated for five years at the Northern Agricultural Research Center (NARC), Havre, MT. Selection of both LB and OC sires was on an index of adjusted yearling weight minus 3.2 X adjusted birth weight (SI). Linebred sires (Fx=16.3%) were from the LB Hereford herd at NARC with 15 yr selection based on SI and OC sires were selected from different purebred herds in Montana unrelated to NARC sires. Calves (375) were produced by mating two LB and two OC sires per year to LB and OC females with of calves each year from repeat matings. Sires were used two years. The general linear model procedure of SAS included year, age of dam, sex of calf, dam line, sire line, with covariate of calf birth date. Dependent variables were birth weight (BW), weaning weight (WW), weaning hip height (HH), yearling weight (YW), and average daily gain on feed (ADG). CATMOD procedure by SAS was used to evaluate proportion assisted calving (AC). Date of birth, year and age of dam were important (P=.01) for all weight and height traits.

Dam breeding only influenced WW (P=.03) with OC calves 8.6 kg heavier. Calves from OC sires were heavier at birth (P<.01) than LB sires (39.5 and 37.2 kg, respectively) and taller (P<.01) at weaning (110.5 and 108.4 cm, respectively). Bull and heifer calf YW from OC sires were heavier (P=.01) than LB sires with bulls 404 and 390 kg, respectively and heifers 363 and 337 kg, respectively. Calves from 2-year-old dams had greater AC (P<.01) than 3+ year old dams. Bull calves from 2-year-old dams and OC sires had greater (P=.04) AC than LB sires (86.0 and 68.6%, respectively) with heifer calves 56.0 and 31.0% AC, respectively. Selecting OC sires on a SI to reduce birth weight and AC was not as effective as in a LB herd selected on a SI for 15 yr with OC sired calves having greater height and weight at weaning and heavier at one year of age.

**Key Words:** Selection index, Birth weight, Beef cattle

**W218 Study of selected physical environmental factors on feed intake of performance-tested beef bulls.** G. T. Tabler, Jr.\*<sup>1</sup>, A. H. Brown, Jr., E. E. Gbur, Jr., K. C. Thompson, I. L. Berry, and D. W. Kellogg, *University of Arkansas.*

Feed intake data from 52 individual 140-d feeding trials conducted over a 13-yr period (1978 to 1990) and corresponding selected environmental data from three locations in Arkansas were analyzed to define more precisely the relationship between feed intake and selected environmental factors of performance-tested beef bulls. Feed intake data originated from bulls (n = 2,002) used in University of Arkansas Cooperative Bull Tests at Fayetteville, Hope and Monticello. After a 21-d adjustment period, bulls were full-fed on an individual basis twice daily in the same stall for 140 d. Initial age and weight were recorded at the beginning of each test and weights were taken at 28-d intervals thereafter. Mean initial weight and age were 273 ± 1 kg and 274 ± 0.9 d, respectively. Selected environmental data, which included thermal heat index (THI), relative humidity from 0600 to 1000 (RH6-10) and rainfall, were obtained from the National Climatic Data Center (Asheville, NC). Data were pooled, divided into five 28-d periods beginning with the start of each test, and data from each period were analyzed separately by the GLM procedure of SAS using all animals over all tests. Feed intake was influenced by initial age in all periods (P < 0.01) and initial weight in Periods 3 through 5 (P < 0.01). Initial weight x breed interactions were present in Periods 1 and 2 (P < 0.01). There were THI x breed interactions evident in all periods (P < 0.01). A RH6-10 influence was noted in Period 2 (P < 0.01). During Periods 3 and 4 there were RH6-10 x breed interactions evident (P < 0.01). A rainfall x breed interaction (P < 0.01) existed during Period 4. Data suggest that environmental effects on feed intake are strongly influenced by breed, and that initial age and weight of cattle when placed on feed affect intake throughout the feeding period.

**Key Words:** Beef cattle, Environment, Feed intake

**W219 Effect of live weight, preslaughter handling, and gender on blood acid-base status in finishing pigs.** D. Hamilton\*<sup>1</sup>, M. Ellis<sup>1</sup>, T. Berto<sup>1</sup>, and K. D. Miller<sup>2</sup>, <sup>1</sup>*University of Illinois, Urbana, IL, USA,* <sup>2</sup>*Elanco Animal Health, Greenfield, IN, USA.*

Live weight has been suggested as an important factor influencing metabolic response of pigs to handling stress and, consequently, the incidence of deaths and downer animals during transport and, ultimately, pork quality. Thus, the objective of this study was to determine effects of preslaughter handling intensity on blood acid-base levels in pigs of varying live weight. Eighty pigs were used in a randomized block design 2 x 2 x 2 factorial arrangement of treatments: 1) live weight (light [104 kg] vs heavy [128 kg]), 2) handling intensity (low vs high), and 3) gender (barrows vs gilts). On the morning of handling test, baseline measurements of blood parameters, rectal temperature, and live weight were collected. Pigs were allowed 2 h rest prior to handling, which consisted of moving pigs through a course (12.2 x 0.91 m) for a total of eight laps. Animals on high intensity treatment were moved rapidly through the course and given 2 shocks/lap with an electric prod while pigs on low intensity were moved at their own pace using a livestock panel and paddle. There were no treatment interactions (P > 0.05) and no effect (P > 0.05) of treatment on baseline blood measurements taken prior to handling. Post-handling, pigs from light treatment group had higher (P = 0.04) blood SO<sub>2</sub> compared to pigs from heavy treatment (65.6 vs 57.2; SE = 2.80) and showed a greater increase (P = 0.05) in PO<sub>2</sub> from baseline to post-handling than did heavy pigs (15.6 vs 8.3; SE = 0.05).

Post-handling, pigs on high-intensity handling had greater ( $P < 0.001$ ) lactate (19.1 vs 4.9; SE = 0.56) and  $PO_2$  (51.6 vs 36.5; SE = 2.44) with lower ( $P < 0.001$ )  $TCO_2$  (18.6 vs 34.7; SE = 0.64), pH (7.02 vs 7.36; SE = 0.015),  $HCO_3$  (16.7 vs 33.0; SE = 0.62), and base excess (-14.2 vs 7.5; SE = 0.75) values than pigs on low-intensity treatment. Results from this study highlight the major impact of pig handling intensity and a limited effect of live weight and gender on blood acid-base status.

**Key Words:** Acid-base balance, Preslaughter handling, Pork quality

**W220 Prediction of wool base, vegetable matter base, fiber diameter, and prickle factor of greasy wool with near-infrared reflectance spectroscopy (NIRS).** C. J. Lupton\*, J. W. Walker, B. S. Engdahl, and F. A. Pfeiffer, *Texas Agricultural Experiment Station, San Angelo.*

A near-infrared reflectance spectrophotometer (Feed and Forage Analyzer Model 6500M, Foss North America, Eden Prairie, MN) fitted with a transport mechanism and using a customized sample holder (scanning area = 82 cm<sup>2</sup>) was used to obtain spectra (at 2 nm intervals in the range 400 to 2498 nm) of 427 core samples (in duplicate) of greasy wool. Twenty-five scans were averaged for each of the duplicate subsamples. The core samples were supplied and had previously been subsampled and analyzed using standard methodology by Yocom-McColl Testing Laboratories, Denver CO. The samples represented a broad cross-section of U.S. wool production. WinISI II software (version 1.04, Infrasoft International, Port Matilda, PA) was used to transform spectral data and calculate prediction equations and expected levels of precision for wool base (WB), vegetable matter base (VMB), average fiber diameter (AFD), SD and CV of fiber diameter, and prickle factor (PF, % of fibers > 30  $\mu$ m). The SE of calibration (SEC), cross validation (SECV), and prediction (SEP) are presented in the table. The SEP and R<sup>2</sup>(P) values for the predictions of the validation set were obtained by using a randomly selected half of the spectra to calculate a calibration equation that was then used to predict constituent values of the other half (actually 207) of the samples. Because SEP > SECV > SEC, possible sampling errors and lack of fit between NIRS-predicted and lab-determined values are indicated. We are attempting to reduce SE and increase R<sup>2</sup> values by repeating the lab analyses on a selected population of the actual subsamples that were scanned.

Constituent	N	Mean	SD	SEC	R <sup>2</sup>	SECV	SEP	R <sup>2</sup> (P)
WB, %	408	45.8	4.07	1.45	0.87	1.57	1.92	0.77
VMB, %	403	1.84	0.75	0.65	0.25	0.66	0.87	0.22
AFD, $\mu$ m	412	23.5	3.09	0.66	0.95	0.76	1.31	0.83
SD, $\mu$ m	410	5.34	1.15	0.31	0.93	0.36	0.50	0.83
CV, %	416	22.4	2.18	1.10	0.74	1.23	1.34	0.66
PF, %	411	14.0	14.5	3.28	0.95	3.70	6.36	0.83

**Key Words:** Near-infrared reflectance spectroscopy, Wool

**W221 Field versus lab measurements for four important wool traits.** F. A. Pfeiffer\*, C. J. Lupton, and A. A. Simpson, *Texas Agricultural Experiment Station, San Angelo.*

The OFDA2000 instrument (Interactive Wool Group, Fremantle, Australia) was developed to measure average fiber diameter and fiber length properties of raw wool under field conditions. An experiment was designed to compare OFDA2000 field measurements of greasy wool with measurements obtained on the same staples after cleansing and re-measuring on a standardized instrument (OFDA 100, BSC Electronics, Perth, Australia) in a conditioned laboratory. Mid-side samples were removed from 1320 sheep representing 18 groups (differentiated by age and sex) from 8 different flocks in western Texas and measured for (*inter alia*) average fiber diameter (AFD), coefficient of variation of fiber diameter (CV), comfort factor (CF, % fibers  $\leq 30 \mu$ m) and average fiber curvature (AFC). Means (and ranges) for the field-tested samples were 20.1  $\mu$ m (15.8 to 27.3  $\mu$ m), 16.8 % (12.7 to 23.5 %), 98.8 % (79.3 to 100 %), and 88.0 deg/mm (47.3 to 134.2 deg/mm), respectively. After cleaning, drying, and conditioning, the samples were re-measured using the OFDA 100. Average differences (OFDA 100 - OFDA2000) and r<sup>2</sup> values for the two sets of data were AFD, -0.22  $\mu$ m and 0.87; CV, 0.96 % and 0.55; CF, -0.08 % and 0.68; and AFC, 26.04 deg/mm and 0.74. The AFD differences were greatest for groups containing yearling sheep having wool that tapered naturally to a tip (i.e., previously unshorn ewes and rams). For mature sheep, average AFD differences

between instruments were close to 0, and r<sup>2</sup> values were high (> 0.9). Average values for CV and CF were similar between instruments but measurements from the two instruments were not as highly correlated as the AFD values. The OFDA2000 consistently underestimated AFC. However, the results were highly correlated with those for the standard instrument (r<sup>2</sup> = 0.74). We concluded that AFD measurements obtained in the field using the OFDA2000 are accurate enough to assist with and benefit selection decisions. Field estimates of the other three traits (CV, CF, and AFC) are not as accurate and should be used with caution.

**Key Words:** Objective measurement, Wool, Sheep

**W222 Protocols of reproductive management and their influences on improvement of fertility in Iranian Holstein dairy cattle.** G. Koolabadi<sup>1</sup>, R. Tahmasbi<sup>1</sup>, B. Saremi\*<sup>2</sup>, and A. Naserian<sup>2</sup>, <sup>1</sup>Dasht Dairy Farm, Neyshabour, Khorasan, Iran, <sup>2</sup>Ferdowsi University of Mashhad, Khorasan, Iran.

The objective of this study was to compare existing methods for synchrony in Holstein dairy cattle and their influence on factors exhibited fertility status. This study carried out in Dasht dairy farm (2000 head), which is located in northeast of Iran (Neyshabour City) and have an acceptable and computerized record keeping system, between years 2002-2003. Cows that didn't show heat until (43 $\pm$ 2d) postpartum selected and allocated to each method randomly. Method 1: Injection 2.5 cc prostaglandin, after 24-72h if cows show heat were inseminated, otherwise steps would be repeated. Method 2: Implantation CIDR on d 0, removing on d8, injection of 1cc estradiol on d9 and if heat was detected on d 10-12, insemination was done. Pregnancy test was done 40-45d after insemination by rectal palpation. Parity, Days in milk (DIM), Adjusted milk production (Milk305), Conception rate (CR), Calving ease (CE) and Open days (OD) were collected individually and analyzed by General Linear Models procedures of SAS v6.12 were used for ANOVA to evaluate differences among experimental groups. The design was completely randomized (unequal replicates). Means were compared with Duncan test. Although Parity, Milk 305d and CE have side effects on fertility but in this experiment data didn't show any significant difference between two methods ( $P \leq 0.49, 0.62$  and  $0.63$  respectively) while DIM, CR and OD were highly reduced by using method 1 and were significantly different ( $P \leq 0.0001, 0.031$  and  $0.0004$  respectively). Based on these results, it seems that using method 1 under Iran conditions should be better and reproductive performance will be improved.

Items	Method1	Method2	SEM
Parity	3.19 <sup>a</sup>	3.44 <sup>a</sup>	0.16
DIM	265 <sup>b</sup>	327 <sup>a</sup>	6.68
Milk (305d)	9037 <sup>a</sup>	9163 <sup>a</sup>	116
CR	3.03 <sup>b</sup>	3.71 <sup>a</sup>	0.14
CE	1.81 <sup>a</sup>	1.91 <sup>a</sup>	0.10
OD	127 <sup>b</sup>	177 <sup>a</sup>	6.21

**Key Words:** CIDR, Prostaglandin, Fertility

**W223 Milk citrate as a potential metabolic indicator in dairy cows.** L. L. Masson\*<sup>1</sup>, T. T. Mottram<sup>1</sup>, and P. C. Garnsworthy<sup>2</sup>, <sup>1</sup>Silsoe Research Institute, Silsoe, U.K., <sup>2</sup>University of Nottingham, Sutton Bonington, U.K.

Citrate is a normal constituent of cow's milk, being an important member of the tricarboxylic acid cycle. It is correlated with *de novo* fatty acid synthesis and may be a useful indicator to assess energy balance. On-line monitoring of milk composition with biosensors during milking may be useful to assess metabolic status. Citrate may be a potential metabolite to measure but sources of variation within cows need to be determined and quantified for accurate data interpretation. The aim of this study was to investigate sources of variation in milk citrate. Three groups of 8 Holstein cows from the University of Nottingham's dairy herd were selected according to days in milk. All cows were fed on the same diet and milked 2 times daily. Milk samples were collected from early (days 4-29), mid (days 103-156) and late (days 265-306) lactation cows for 10 consecutive days to investigate diurnal, day-to-day and lactational variation. Citrate was determined by high performance liquid chromatography and data analysed by General ANOVA. Day-to-day variation was estimated at 3.2mM, although there was no significant difference between samples taken at AM and PM milkings ( $P=0.129$ ). There was a significant effect of lactation stage ( $P < 0.001$ ) with citrate

being  $10.89 \pm 0.24 \text{mM}$ ,  $9.76 \pm 0.14 \text{mM}$  and  $10.26 \pm 0.15 \text{mM}$  in early, mid and late lactation respectively. Variability between cows was greatest in early lactation, ranging from 0.66-3.22mM. These variations would make interpretation of daily measurements difficult with current knowledge. Several other factors also affect milk citrate, including nutrition, health status and season and these must be taken into consideration if citrate is to be measured automatically as an indicator of metabolic status. However, the amount of data required initially to establish variability within cows and normal baseline levels would likely be very large and in practice this nutritional management system may not be feasible.

**Key Words:** Milk citrate, Variation, On-line monitoring

**W224 A survey of mortality and calf management in U.S. Jersey herds.** S. Bascon\*, R. James, M. McGilliard, and E. Hovingh, *Virginia Tech.*

Our objectives were to assess frequency of mortality of Jersey calves in the United States, and examine relationships between nutrition, management, and mortality. Fifteen percent of 577 herds were selected (n=88) by region, rolling herd average milk, and herd size to obtain a representative sample of the population. Herds were located in PA, OH, or IN (n=25), Southeast (n=16), Northeast (n=17), WI (n=8) and West (n=22). Surveys were conducted by personal interview between December 2000 and June 2001. Herds averaged  $7180 \pm 757$  kg rolling herd average milk, 153 cows, and 199 births annually. Mortality averaged  $5.0 \pm 6.1\%$  during first 24 h of life including stillbirths,  $6.7 \pm 8.4\%$  from 24 h to 3 mo of life, and  $1.3 \pm 1.6\%$  from 3 mo to calving. First colostrum was fed 3.8 3.0 h after birth at 1.9 0.6 L. Calves were weaned at 9.4 3.2 wk. Higher herd milk production and more liquid fed to calves were correlated with reductions in mortality by 24 h. Frequency of mortality by 24 h was highest in herds that calved cows on pasture, and registered less than 100% of calves. Less mortality from 24 h to 3 mo. was associated with herds that used maternity pens, and weaned calves at a younger age. Increased mortality from 24 h to 3 mo was observed in herds that offered calf starter and forage at a later age, used colostrum supplements, and used natural service to breed heifers. Mortality in Jersey calves may be reduced by offering calf starter to younger calves, using maternity pens, and reducing age at weaning to 8 wk of age.

**Key Words:** Jersey calves, Survey, Mortality

**W225 Effects of ozonation of the swine nursery building on air quality and growth performance of weanling piglets.** K. W. Kim, J. H. Woo, D. H. Kim, and C. Y. Lee\*,<sup>1</sup> *Regional Animal Industry Research Center, Jinju National University.*

Two experiments (Exp.) were performed to study the effect of ozonation on air quality and growth performance of weanling piglets. Ozone was generated using a commercial apparatus outside the nursery building and infused into the house through a duct at a level of 0.03 ppm. In Exp. I, concentrations of harmful gases and temperature of the nursery house were recorded every two hours for 21 days. In Exp. II, 40 cross-bred weanling piglets weighing approximately 7 kg were raised in two ozonated or unozonated control pens alternatively for three weeks and this procedure was repeated three times. In Exp. I, concentrations of ammonia and carbon dioxide of the nursery house were reduced by 22% and 12%, respectively, by the ozonation compared with those of unozonated control house. However, hydrogen sulfide concentration and temperature were not affected by the ozonation. In Exp. II, weight gain, feed intake and feed conversion efficiency were not affected by the ozonation. Collectively, results indicate that ozonation is effective for improving the indoor air quality of the swine nursery unit without affecting the production efficiency.

**Key Words:** Weanling piglets, Ozone, Harmful gas

**W226 Honeybee-keeping sector in Hungary.** L. Nyars<sup>2</sup>, J. S. Szarnoczai\*<sup>1</sup>, and H. F. Salem<sup>1</sup>,<sup>1</sup> *Szent Istvan University, Godollo, Hungary,* <sup>2</sup>*Research and Information Institute for Agricultural Economics, Budapest, Hungary.*

In Hungary, 90 % of honey production is for human and based on the estimations the rest 5-10 % of the honey production is used by the industry (baking industry, sweets industry, pharmaceutical industry and cosmetics) and social programmes. As for the sales of honey,

there are several marketing channels. The wholesalers purchase 10-13 thousand metric tons of honey from the producers each year depending on the fluctuation of honey production, which is the most significant part of the total production annually. Nominal capacity of the Hungarian honey processing plants is about 40 thousand metric tons, which is double the highest production level of the last ten years. Most of the commercial companies operate their own honey processing plants. This is the reason, why capacities of honey processing exceed level of actual production. The production potentials could make it possible collect 40-46 thousand metric tons of honey, and this quantity could also be processed by actual processing capacity. The cost-income analyses do not justify the exploitation of Acacia forest. Cost-income calculations were made in two different categories. In the category of horizontal hives with frames, the calculations refer to honeybee keeping farms with 50, 100, 150, 200 bee colonies, while in category of hives with supers- boxes honeybee keeping with 200, 400, 600, 800, and 1000 colonies were referred to. Yields were determined by categories. Real incomes were generated at honeybee keeping farms provided with hives with supers. Larger stocks with higher yields resulted in higher profitability indicators. However the high risks, like risk of animal health, of large yields cannot be ignored. Bee keeping farms with less than 100 bee colonies cannot be competitive in the market. In order to remain on markets their co-operation is indispensable.

**Key Words:** Honeybee-keeping, Real incomes, Competitive on market

**W227 Particle size, feed intake, milk yield and chewing activity in Holstein cows.** P. Melendez\*<sup>1</sup>, N. Back<sup>2</sup>, S. Lanhart<sup>1</sup>, and A. Donovan<sup>1</sup>,<sup>1</sup> *College of Veterinary Medicine, University of Florida,* <sup>2</sup>*North Florida Holstein, Inc.*

The objectives were to determine the relationship between fractions of a particle size evaluator at initial feeding and the weigh-back (WB) and to establish the association of fractions with milk yield, feed intake and chewing activity of lactating cows. Models were designed considering fractions as fed and DM basis. The study was conducted in a Florida dairy farm with a RHA of 10,500 kg. One side of a free-stall barn with 160 mid lactation cows was used. Cows were fed a TMR 3X. Nutritional composition was 59.5back was the sum of the 3X. During March 2002 a TMR sample was collected daily from the feed bunk immediately after a.m., noon and p.m. feeding and WB. Particle size was evaluated using the Penn State separator. Initial and WB samples were processed daily after collection. After processing, a sub-sample from each fraction was taken for DM content. Max and min daily temperatures were recorded. Four h after the am feeding, numbers of cows chewing and eating were counted. Milk yield was recorded daily. Linear regression models were developed. Models were for feed intake, coarse, medium and fine fractions from WB, milk yield, and rate of chewing. Table shows that significant models were feed intake, coarse plus medium fraction, medium, milk yield and chewing proportion both as fed and DM. Differences between models were minor. This suggests that when a particle size separator is used to evaluate a TMR, DM content of fractions is not critical.

As Fed Basis					
Dependent	Independent	Coefficient	SEM	P-value	r <sup>2</sup>
Feed intake	Min. Temp.	-0.07	0.03	0.03	0.18
Coarse+Med.	Max. Temp.	0.57	0.28	0.05	0.44
	DMI	-3.43	1.06	0.004	
Med.	DMI	-2.96	0.71	0.0003	0.49
	Med.	0.77	0.31	0.01	
Milk Yield	Med.	-0.66	0.21	0.005	0.25
Chew. Rate	Eating	1.05	0.21	0.0002	0.44
Dry Matter Basis					
Dependent	Independent	Coefficient	SEM	P-value	r <sup>2</sup>
DMI	Min. Temp.	-0.06	0.03	0.04	0.18
Coarse+Med.	Max. Temp.	0.54	0.29	0.08	0.39
	DMI	-3.32	1.12	0.007	
Med.	DMI	-3.13	0.77	0.0004	0.41
	Med.	0.79	0.35	0.03	
Milk Yield	Med.	-0.64	0.22	0.0079	0.23
Chew. Rate	Eating	1.07	0.22	0.0001	0.43

**Key Words:** Particle size, Chewing, Dairy cows

## Forages & Pastures: Grazing, cultivars, forage management

**W229** Nutritional quality of twenty alfalfa (*Medicago sativa* L) cultivars from Embrapa's Brazil germplasm bank. H. Carneiro\*<sup>1</sup>, M. de A. Botrel<sup>1</sup>, F. de S. Sobrinho<sup>1</sup>, and M. Villaquiran<sup>2</sup>, <sup>1</sup>EMBRAPA, CNPGL, Minas Gerais, Brazil, <sup>2</sup>E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK..

Alfalfa is one of the most important forages in the world for dairy cattle production because of its high nutritional value. Although there are many studies on cultivated alfalfa in temperate regions, studies on the nutritional quality of alfalfa under tropical conditions are scarce. Recently, Embrapa, Brazil's national agriculture research service, has initiated alfalfa breeding studies and developed several cultivars. The objective of this research was to evaluate the production and nutritional quality of the Embrapa alfalfa germplasm bank under tropical conditions, specifically in the Zona da Mata region of Minas Gerais state in Brazil. Twenty alfalfa cultivars were evaluated over a 2-yr period in a randomized block experimental design with three replications and five different harvest intervals for nutritional quality and 18 harvest intervals for production determinations. Data were analyzed statistically for the effects of cultivars, harvest interval and the interaction. There were significant differences among cultivars for forage production ( $P < 0.04$ ), CP content ( $P < 0.02$ ), NDF ( $P < 0.05$ ), and in vitro and in situ digestibility ( $P < 0.05$ ), but not differences were found in lignin ( $P > 0.05$ ). These results indicate that Crioula CNPGL1, P 58N58, and F 686, were superior for dry matter production, crude protein and neutral detergent fiber. The Embrapa alfalfa cultivar Crioula CNPGL1 was 14% more productive than P58N58 ( $P < 0.05$ ) and 20% more productive than for F686 ( $P < 0.05$ ). The superior production and quality of the Crioula CNPGL1 alfalfa cultivar reflect good adaptability to soil and environmental conditions of the Zona da Mata area. Therefore, it is evident that potential exists for immediate utilization of these cultivars in this area; however, further studies are needed for different soils types as well as field-testing by producers.

**Key Words:** Alfalfa, Nutrition Quality, Tropics

**W228** Behaviors of transition dairy cows and heifers. K. J. Daniels\*, J. R. Townsend, S. S. Donkin, E. A. Pajor, A. G. Fahey, and M. M. Schutz, Purdue University, West Lafayette, IN.

Management strategies are critical for a successful transition period and may differ for cows and first calf heifers. The objective of this study was to compare behaviors between transition cows and heifers, emphasizing feeding behaviors and the relationship of these behaviors with DMI and milk yield. Five multiparous Holstein cows (C) and five Holstein heifers approaching first calving (H), were housed in tiestalls from 28d prior to expected calving and provided feed *ad libitum*. The C and H were videotaped 24 h/d, using time-lapse video recording, beginning 15d prior to expected calving until 14d after calving. On d-6, d-2, d2 and d8 relative to actual calving the durations of the following behaviors were measured: standing (S), lying (L), resting (Re), feeding (F), ruminating (R) and ruminating while lying (RL). Daily DMI and postpartum milk yield were recorded. The model selected for analyses included effects of parity group (C and H), day and interactions. There were no significant differences between C and H in L, F or RL. For both parity groups, L ( $P < .01$ ) differed across d and there were d by parity group interactions for F ( $P < .05$ ) and RL ( $P < .01$ ). For all animals, L decreased through d2 and then increased on d8. For C, F decreased through d2 and then increased on d8; while for H, F increased until d-2, decreased at d2 and then increased on d8. Through d2, RL decreased for C and then increased on d8; but for H, RL did not decrease until d2 and then increased on d8. As expected, C had greater milk yield ( $P < .05$ ) and DMI ( $P < .01$ ) than H. Milk yield on d8 was significantly affected by Re on d-6 ( $P < .01$ ). The DMI on d8 was significantly affected by F on d2 ( $P < .01$ ). Behaviors, DMI and milk yield differed for transition C and H, indicating that managing them differently during the transition period may be beneficial.

**Key Words:** Dairy cattle, Transition, Behavior

**W230** Forage production and quality of triticale cultivars in north Alabama. M. Lema\*, E. Cebert, and V. Sapra, Alabama A & M University.

Because of its cold tolerance and double-cropping potential, triticale can play an important role in bridging the feed shortage gap in late fall and winter in north Alabama when other cool season grasses become dormant. Field trials were conducted in 2001 and 2002 at Winfred Thomas Agricultural Research Station (WTARS) and Sand Mountain Agricultural Substation (SMAS) in north Alabama to evaluate the forage yield and quality of six triticale (*X Triticosecale Wittmack*) cultivars (TCL105, TCL111, TX98D955, TX96VT5019, Tritical 498 and Tritical 2700). The cultivars were planted in four replicated 6-row plots 6.1 m long with rows 1.22 m apart in a randomized complete block design. At both locations, TX98D955, TX96VT5019 and Tritical 2700 produced higher ( $P < 0.05$ ) forage DM than the other cultivars (2-yr average of 4,134; 3,851 and 4,063 kg/ha for TX98D955, TX96VT5019 and Tritical 2700, respectively versus 2,744; 3,070 and 3,077 kg/ha for TCL105, TCL111 and Tritical 498, respectively at WTARS and 6,326; 5,974 and 5,938 kg/ha for TX98D955, TX96VT5019 and Tritical 2700, respectively versus 4,531; 3,784 and 4,060 kg/ha for TCL105, TCL111 and Tritical 498, respectively at SMAS). Crude protein, ether extract and gross energy contents were lower ( $P < 0.05$ ) for TCL111 and TCL105. Acid-detergent fiber content was higher ( $P < 0.05$ ) and IVDMD lower ( $P < 0.05$ ) for TCL 105. The cultivars TX96VT5019 and TX98D955 had higher ( $P < 0.05$ ) P content and the cultivars TCL105, TCL111, TX96VT5019 and TX98D955 higher ( $P < 0.05$ ) Ca content than the rest. The cultivars TCL105 and TCL111 were higher ( $P < 0.05$ ) in Mg and lower ( $P < 0.05$ ) in K than the other cultivars. Sulfur was higher ( $P < 0.05$ ) for Tritical 498 and Zn higher ( $P < 0.05$ ) for TCL498, TX96VT5019 and TX98D955. Iron content was lower ( $P < 0.05$ ) for TX96VT5019 and TX98D955 than for the other cultivars.

**Key Words:** Triticale cultivars, Forage production, Forage quality