percent for each season, followed by calculation of S:W ratios. During 2005, S:W ECM ratios above 0.96, 0.90 to 0.96 and below 0.90 were recorded in 40, 38 and 22% of the dairy farms in Israel respectively. S:W - ECM, fat, protein, SCC and C.R. ratios were 0.93, 0.94, 0.96. 1.2 and 0.4, in 495 family farms averaging 50 cows and 0.93, 0.95, 0.96, 1.05 and 0.51, in 191 cooperative farms averaging 300 cows, respectively. High, middle and low producing herds (mean winter ECM yields of 35.2, 33.1 and 30.2 kg/d respectively), had S:W ratios of 1.03, 0.93, 0.82 and 0.63, 0.51, 0.38 for ECM and C.R. respectively. S:W production ratio was above 0.96 in 70% of the farms located in cool regions, compared to only 30% of the farms located in extremely hot regions. The computerized report described here, enables the detection of farms that need improvement of summer performance and allows the provision of necessary consultancy and follow up by extension agents.

Key Words: Heat Stress, Milk Production, Conception Rate

Lactation Biology: Applied Lactation Biology

754 Induced lactation in nulliparous dairy goats with or without prolactin secretion enhancement. A. A. K. Salama*, G. Caja, E. Albanell, S. Carné, R. Casals, and X. Such, *Universitat Autònoma de Barcelona*, *Bellaterra, Spain*.

Fourteen Murciano-Granadina nulliparous goats were used to evaluate the effects of a standard protocol for inducing lactation with or without using a prolactin releasing agent (reserpine). Goats were submitted to a hormonal challenge consisting of daily s.c. injections of estradiol-17β and progesterone (0.5 and 1.25 mg/kg BW, respectively) for 7 d (d 1 to 7). Goats were divided into 2 groups and i.m. injected with 1 mg/d of reserpine (n = 7) or vehicle as control (n = 7) on d 12, 14, 16, 18 and 20. Lactation was triggered by i.m. injections of dexamethasone (10 mg/d) during d 18 to 20. Goats were machine-milked once daily from d 21 to 120 when goats were mated jointly with the rest of the herd after the buck effect. Goats initiated lactation on d 21 (100%) and milk yield increased logarithmically ($R^2 = 0.95$) thereafter. Difference in milk yield between control and reserpine goats increased as lactation advanced, peaking at wk 10 of lactation when reserpine goats yielded more milk than control goats (1,079 vs. 850 mL/d, respectively; $P = 0.08$). However, milk yield at the peak averaged only 55% of peak milk yield observed in primiparous goats from the same herd. Composition of initial milk (d 21) was lower than the expected for colostrums ($P < 0.001$). Milk composition steadied after d 3 of lactation. Teat length increased in control goats during mammogenesis (d –2 to 35; $P < 0.05$) but steadied in reserpine goats. Distance between teats, and volume and depth of the udder increased ($P < 0.05$) similarly in both goat groups during mammogenesis and lactation. After mating, 82% of the contemporaneous goats in the herd became pregnant, whereas only 21% of the experimental goats conceived (1 reserpine and 2 control goats), revealing the occurrence of side effects after the lactation induction treatment. In conclusion, lactation induction was effective and reserpine improved milk yield in nulliparous goats, but it seems that neither the obtained milk yield nor the side effects on fertility support its recommendation in practice.

Key Words: Lactation Induction, Prolactin, Dairy Goat

755 Effects of shortening the dry period from 60 to 40 days on milk yield and composition during the subsequent lactation. D. J. Grusenmeyer*, C. M. Ryan, R. W. Everett, D. M. Galton, and T. R. Overton, *Cornell University*, *Ithaca, NY*.

Holstein cows (n = 306) at the end of first (n = 158) or greater (n = 148) lactation on three commercial farms were used to determine effects of dry period length on subsequent milk yield and composition. Cows producing 22 kg/d of milk or more at 60 d before expected calving were assigned randomly to receive either a 60 d (actual mean = 58.5 d; n = 150) or 40 d (actual mean = 40.6 d; n = 156) dry period. Milk yield and composition data were collected for the first 10 monthly test days of the subsequent lactation; previous 305-d mature equivalent milk yield for each cow was used as a covariate during data analysis. Shortening the dry period from 60 to 40 d decreased milk yield (39.2 vs. 37.7 kg/d; $P < 0.004$); however, the difference was attributable largely to effects on one farm (40.4 vs. 40.3; 40.8 vs. 37.4; 36.3 vs. 35.4 kg/d; farm by treatment, $P < 0.02$) for 60 vs. 40 d dry on the three farms, respectively, and to cows at the end of their first lactation (39.6 vs. 37.1 and 38.8 vs. 38.4; treatment by parity, $P < 0.04$). Shortening the dry period tended to increase subsequent milk fat content (3.63 vs. 3.70; $P < 0.11$) and increased true protein content (2.98 vs. 3.05; $P < 0.001$); therefore, overall effects of dry period length on yields of milk fat (1.41 vs. 1.38 kg/d; $P = 0.18$) and true protein (1.15 vs. 1.13 kg/d; $P = 0.29$) were not significant. Farm by treatment interactions ($P < 0.04$) for yields of milk fat and true protein followed the same pattern as those described for milk yield. Somatic cell linear score was not affected by dry period length (2.76 vs. 2.79; $P < 0.81$), athough effects varied by farm (farm by treatment, $P < 0.04$). Results from data analysis following Test Day Model adjustment were consistent with those reported above. Overall, results support the concept that shortening the dry period of multiparous cows from 60 to 40 d results in minimal impact on subsequent production, and that shortening the dry period of primiparous cows from 60 to 40 d may decrease subsequent production.

Key Words: Dry Period, Transition Cow

756 Effects of altered timing and duration of unilateral frequent milking during early lactation on milk production of dairy cows. E. H. Wall* and T. B. McFadden, *Lactation and Mammary Gland Biology Group, Department of Animal Science, University of Vermont*, *Burlington*.

Several studies have reported that increased milking frequency during early lactation can elicit immediate and long-lasting increases in milk yield, however the timing and duration of frequent milking has not been optimized. Our objective was to utilize a half-udder model to determine milk yield response to 2 wk of frequent milking imposed at two different times in early lactation. Multiparous Holstein cows were assigned at parturition to unilateral frequent milking (UFM), which entailed twice-daily milking (2X) of the left udder half and four-times daily milking (4X) of the right udder half on d 1 to 14 (UFM-1-14) or 7 to 21 (UFM-7-21) of lactation (n = 10 cows per treatment). Before

and after UFM, cows were milked 2X. Half-udder milk weights were measured at 1, 3, 7, 14, 21, 28 and 35 DIM, then once every 3 mo for the remainder of lactation. For both treatments, the 4X udder halves produced more milk than the 2X udder halves during UFM (P's < 0.001), resulting in an average difference of 3.7 ± 0.7 kg/d in UFM-1-14 cows and 2.9 ± 0.9 kg/d in UFM-7-21 cows. After cessation of UFM, milk production of the 4X udder halves decreased in both treatments (P < 0.01). However, throughout the remainder of lactation, UFM-7-21 cows produced 1.5 ± 0.6 kg/d more milk from the 4X side than the 2X side (P < 0.05), whereas in UFM-1-14 cows the difference was 1.2 ± 0.7 kg/d, which was not significant (P=0.16). The mean difference in milk yield between 4X and 2X udder halves over the entire lactation was not different between UFM-1-14 and UFM-7-21 cows (P > 0.50). Moreover, the total milk yield response to UFM observed in the current study did not differ from that observed in a previous study in which cows were assigned to UFM for days 1 to 21 of lactation (P > 0.60). We conclude that UFM during days 7 to 21 of lactation elicited a persistent increase in milk production of the frequently-milked udder half. In addition, the overall milk yield responses observed for UFM-1-14 or UFM-7-21 were not significantly different than that previously observed for UFM on days 1 to 21 of lactation.

Key Words: Frequent Milking, Local Regulation, Mammary Gland

757 Use of milking frequency for alleviating milk depression in Holstein dairy cows under heat stress conditions. R. Ben Younes[1], M. Ayadi[2], T. Najar[1], M. Zouari[3], A. A. K. Salama[4], X. Such[4], M. Ben M'Rad[1], and G. Caja*[4], [1]*Institut National Agronomique de Tunisie*, *Tunis, Tunisia*, [2]*Institut Superieur de Biologie Appliquée de Medenine*, *Tunisia*, [3]*Office des Terres Domaniales*, *Tunis, Tunisa*, [4]*Universitat Autònoma de Barcelona*, *Bellaterra, Spain*.

Forty-eight Holstein Friesian cows raised in North Tunisia were used to study the effects of increasing milking frequency during summer heat stress. Twice daily milked cows (170 DIM, 18.0 L/d, 3.43% fat, 3.09% protein) were grouped in early July according to udder cistern size (large-cisterned, 44.5 cm^2; small-cisterned, 20.6 cm^2) and randomly allocated to a milking frequency treatment (×2 or ×3) for 70 d. Average temperature, relative humidity and thermohygrometric index (THI) during the experiment ranged between 20.9-30.2°C, 49-78% and 67-81. Lactational performance and physiological traits were recorded fortnightly and monthly, respectively. Initial milk yield was used as covariate. Respiratory rate and rectal temperature showed the highest correlations (r > 0.9) with temperature on test-days. Heat stress symptoms on rectal temperature, and respiratory and heart rates were detected when THI was greater than 64, 75 and 78, respectively. Increases per THI unit were 0.2°C, 5 breaths/min and 1 beat/min, respectively. Milk yield was decreased by effects of heat stress and lactation stage during the experiment (P < 0.001) but milk losses reported in ×3 cows were half those of ×2 cows (–2.3 vs –4.7 L/d; P = 0.08). Decrease in milk yield was accompanied by a marked increase in milk fat (16%; P < 0.01) but no effect on milk protein was found (P = 0.39). As a result, only 5% loss in energy corrected milk was observed in ×3 cows at the end of the experiment. Milk urea decreased 22% on average during the experiment (P < 0.001). No interaction between cistern size and milking frequency was detected for milk yield (P = 0.70) or milk losses (P = 0.25). In conclusion, temperatures above 25ºC induced heat stress symptoms in Holstein cows raised in Tunisia, which was observed when THI was greater than 64. Best external indicator for detecting heat stress was respiratory rate which markedly increased when THI > 75. Milk yield depression due to heat stress was partially alleviated by ×3 milking which may be a useful short-term strategy for Tunisian dairies.

Key Words: Heat Stress, Milking Frequency, Dairy Cows

758 Comparison of manual and automatic milk flow recording in dairy goats. G. Caja[1], M. Rovai*[2], S. Carné[1], A. A. K. Salama[1], X. Such[1], and R. M. Bruckmaier[3], [1]*Universitat Autònoma de Barcelona*, *Bellaterra, Spain*, [2]*E (Kika) de la Garza American Institute for Goat Research*, *Langston, OK*, [3]*Veterinary Physiology, University of Bern*, *Switzerland*.

A total of 24 multiparous Murciano-Granadina dairy goats milked once-daily were used at wk 12 of lactation to compare manual and automatic methods for milk flow recording during routine milking. Goats were machine milked in a 2 x 12 parallel milking parlor with low milk pipeline at 42 kPa vacuum, 90 pulses/min and 66% pulsation rate. At least 3 replicates for each method and each goat were randomly done during consecutive days (169 milk flow curves in a total of 10 d). Manual flow (MF) recording was done by udder half using millimetric paper strips in conical milk jars of 2 L (Westfalia-Surge Ibérica, Granollers, Spain) with manual marks done every 5 s. Automatic flow (AF) recording was done in whole udder using a Lactocorder (WMB, Balgach, Switzerland) specially calibrated for cow quarter milking. Both milk recording devices were placed at the same height under the milking platform. Milk flow curves were classified into 4 groups according to curve shape and maximum peak flow (sharp and >1.5 L/min; plateau and >1.0 L/min; interrupted plateau; flat and <1.0 L/min). Five MF and 5 AF curves were discarded. Percentages of curves by group were 24:35:12:29 (n = 61) and 44:23:8:25 (n = 98) for MF and AF respectively. Repeatability within (R > 0.9) and correlation between methods (R^2 = 0.80) were high. Sixty percent of goats (MF, 62.5%; AF, 58.3%) were included in the 2 first curve groups considered more favorable for milkability. Total milk yield was similar for both methods (MF, 2.08 ± 0.06 L; AF, 2.01 ± 0.05 L; P = 0.48), but milking time before machine stripping (2.00 vs. 2.56 min; P =0.05) and maximum milk flow in the 1st min (1.78 vs. 1.16 L/min; P = 0.11) were 28 and 54% higher for MF vs. AF. On the contrary, recorded values for milk amount collected in 2 min (1.61 vs. 1.78 L; P = 0.23) and in 3 min (1.77 vs. 2.47 L; P <0.001) were overestimated by AF in regard to MF. In conclusion, milk yield, shape and class of milk flow curves were adequately recorded by both methods. Nevertheless, large differences were found on most milk flow traits, the automatic method requiring more accurate calibration for low flow conditions.

Key Words: Milking Ability, Dairy Goats, Milk Flow

759 Comparisons of teat structure changes after milking between farms with high and low bulk somatic cell counts. P. Vinitchaikul* and W. Suriyasathaporn, *Faculty of Veterinary Medicine, Chiang Mai University*, *Muang, Chiang Mai, Thailand*.

Objectives of this study were to evaluate the changes in teat structures after milking between farms with high and low bulk somatic cell counts. Thirty-nine lactating cows from 10 small-holder dairy farms in Chiang Mai and Lamphun provinces, Thailand, were selected. Milk samples were collected from all quarters to measure somatic

cell counts (QSCC). The teat structures were examined using the ultrasound machine model ALOKA SSD 500 with 5 MHz linear probe. The teat structures consist of teat-canal length (TCL), teat-width (TW) at the top of the teat canal, teat-wall thickness (TWT) at 1 cm above the end of the teat canal and teat-cistern width (TCW) at the same level. On each teat, all structures were scanned before and after the evening milking period. Data on the averages of bulk milk somatic cell counts (BSCC) for the month of experiment were collected from their farm's cooperatives. Farms with BSCC more than 300,000 cells/ml were defined as high BSCC (HBSCC). Student's T Tests were used to compare the changing of teat structures after milking and log of QSCC between quarters from farms with high and low BSCC. Results show that average BSCC of farms with high and low BSCC was 372 ± 25.5 (n=5) and 197 ± 41.6 (n=5) x1,000 cells/ml, respectively. The QSCC and percent changes in TWT and TCW were different between farms with high and low BSCC ($P < 0.05$). Percentage of changes in TWT and TCW of HBSCC farms (9.75% and -18.42%, respectively) were significantly different from farms with low BSCC (2.42% and -8.38%, respectively). In conclusion, the changes in teat structures after milking are associated with BSCC.

Key Words: Teat, Somatic Cell, Milking

Production, Management & the Environment - Livestock and Poultry: Livestock Production and Management

760 Effects of winter feeding systems on cow performance, soil nutrients, and crop biomass. B. M. Kelln*[1], H. A. Lardner[1,2], J. Schoenau[1], and K. Lang[1], [1]*University of Saskatchewan*, *Saskatoon, Saskatchewan, Canada*, [2]*Western Beef Development Centre*, *Lanigan, Saskatchewan, Canada*.

Two experiments were conducted to determine the effects of winter feeding systems on beef cow performance, soil nitrogen (N), and crop yield (DMY) the following year. The research site was a 40 hectare field seeded to barley (*Hordeum vulgare*) (cv. Ranger), located on Orthic Black soil. At the site, experiment one consisted of 36 hectares that was used for a winter feeding trial, while experiment two consisted of a 4 hectare paddock that was used for compost vs. fresh manure trial. In experiment one, crossbred pregnant beef cows (n=180) (range 626 to 634 kg) were allocated to one of four replicate (n=3) winter feeding systems. Feeding systems included (1) field bale grazing (BG), round barley greenfeed bales fed *ad libitum*; (2) field straw & chaff grazing (ST/CH), barley straw/chaff piles fed *ad libitum*; (3) field swath grazing (SG), barley swaths fed in windrows *ad libitum*; and (4) drylot feeding (DL), round barley greenfeed bales fed *ad libitum* in bunk. Cows were weighed at start, every 21 d and end of feed period. Ultrasound measurements (rib and rump fat) and body condition scores [5-point scale (1=thin, 5=fat)] were taken at the start and end of feed period. In experiment two, fresh (FM) and composted (CM) manure from the DL system was applied mechanically in the fall on replicated plot areas (n=4). Spring soil samples were taken from high, mid, and low slope positions (n=3), at the 15 cm soil levels for both experiments. DMY was estimated for both experiments by sampling (n=5) using meter quadrats. In experiment one, manure distribution of each treatment was mapped using a 32 point grid and computer analysis programming. Cow body weight ($P<0.01$), was minimally affected by the swath graze treatment. Soil N levels were not significantly different ($P>0.10$) between slope positions or treatments. Results indicate that extensive winter feeding systems on annual cropped fields have minimal effects on cow performance, DMY and soil N levels.

Key Words: Dry Matter Yield, Straw/Chaff Grazing, Swath Grazing

761 Incorporating condensed corn distillers solubles into an integrated pasture and drylot finishing system for feedlot steers. T. Purevjav*, M. P. Hoffman, and W. B. Roush, *Iowa State University*, *Ames*.

The objectives of this experiment were to evaluate the use of condensed corn distillers solubles (CCDS) mixed with chopped corn stalks on a pasture and drylot growing-finishing program. A three-year study was conducted, using 112 Angus and Angus crossbred steer calves each year. Calves were weighed and assigned to four treatment groups by weight and color pattern, with 4 replications, and 7 cattle per replication in each year respectively. Treatments one (TRT 1) and two (TRT 2) were fed in the feedlot from May until harvested. TRT 1 included chopped alfalfa hay and corn, and TRT 2 included chopped corn stalks and CCDS. Treatments three (TRT 3) and four (TRT 4) utilized rotational bromegrass pasture grazing (May-September) with TRT 4 also receiving chopped corn stalks and CCDS. Following pasture, chopped alfalfa hay and corn (TRT 3) or chopped corn stalks and CCDS (TRT 4) were provided during the feedlot finishing period. Steers were weighed every 28 days and daily feed intake was recorded to obtain feed consumption and feed conversion among the treatments during drylot feeding. The bromegrass pasture consisted of 24 paddocks, each .69 ha in size. Cattle were fed on average to 591 kg and harvested to obtain carcass measurements. Comparing TRT 1 vs. TRT 2 and TRT 3 vs. TRT 4, TRT 1 and TRT 3 had greater daily DMI and ADG ($P<0.05$) than TRT 2 and TRT 4, respectively. Feed conversion during the drylot feeding period favored TRT 1 over TRT 2 and TRT 3 over TRT 4 ($P<0.05$), and overall TRT 1 and 2 over TRT 3 and 4 ($P<0.05$). When TRT 3 and TRT 4 were removed from pasture, TRT 4 had gained well over .23 kg/day better than TRT 3. Though this advantage did not carry over into drylot feeding, this might be a function of daily energy intake while on pasture. Average carcass weights and liver abscesses were not significantly different across treatments, but differences were found among treatments ($P<0.05$) for loineye area, backfat thickness and kidney, pelvic and heart fat. The finding resulted in a sligthly higher quality grade for cattle fed in the feedlot and on hay for the duration of the feeding period. Overall treatment responses for yield and quality grades were similar.

Key Words: Feedlot Cattle, Pasture, Condensed Corn Distiller Solubles