

W88 Development of a web-based goat producer education program. S. Hart*, T. Gipson, R. Merkel, and T. Sahl, *Langston University, Langston, OK*.

The objective was to develop a web-based goat producer education program for the certification of goat producers conceptually similar to other master farmer programs. In addition, the information was to be available for browsing by the public. Such program is needed to fill the knowledge vacuum and combat disinformation. A collaborative group of goat specialists from 1890 Institutions and major goat industry associations met and identified subject areas that needed to be included in a producer education program. The subject areas were assembled into 22 modules. A core set of modules was identified as having critical information for goat production (such as animal management and breeding modules) with the remaining modules as providing information to meet special needs (such as disaster preparedness and managing guard dogs). Authors were identified and contracted for writing the modules. The modules were reviewed by outside reviewers,

both academic and producers and revised by the authors. Behavioral objectives and test questions were formulated for each module. Pictures for the modules were identified and added. Each module was converted to HTML for the web site. A grading system using Perl was used to keep track of grades from pre- and post-test to document learning. To earn certification, producers must complete the nine core modules with a minimum score of 70% on each one. A producer who makes over 85% on the pre-test is given credit for that module. A number of goat associations have agreed to identify or designate their members who have earned their certification in this course. The producer education course can be accessed online at <http://WWW2.luresext.edu>. In the first month 38 producers have completed 46 modules and improved their knowledge by an average of 25.1 points between the pre- and post-test. In addition, producers have tested out of a total of 67 modules. This producer education system is a valuable training resource for goat producers, extensionists, and scientists alike and provides a valid source for goat information.

Key Words: Education, Extension, Goat

Horse Species: Equine Sciences

W89 Equine muscle Glut-4 expression and glycogen content are altered by dietary energy source and physical conditioning. L. Stewart-Hunt, R. Geor*, and J. McCutcheon, *University of Guelph, Guelph, Ontario, Canada*.

Physical activity is one factor that may modify the effects of diet on mechanisms of glucose utilization in muscle. The objective of this study was to characterize the effects of dietary energy source and physical conditioning on skeletal muscle Glut-4 and glycogen content (GLY) and the activities of hexokinase (HK) and glycogen synthase (GS) in horses. Fourteen mature paddock-rested Standardbred horses completed the following 3 phases: 1) a 3-week baseline phase (Phase 1) in which horses were fed only grass hay cubes; 2) a 6-week adaptation (Phase 2) to a concentrate high in either starch and sugar (HiCHO; 53% nonstructural [NSC] carbohydrate, 2.3% fat, 12.9% CP on a DM basis) or fat (LoCHO; 10% NSC, 14% fat, 12.8% CP on a DM basis), fed in a 1:1 ratio with the hay cubes (6.2% NSC); and 3) a subsequent 7-week period of physical conditioning during which horses remained on previously assigned diets (Phase 3). Middle gluteal muscle biopsies to assess GLY, HK and GS activity, and Glut-4 protein expression were obtained at the end of each phase. Dietary groups were compared by repeated measures ANOVA. Data are presented as mean \pm SD. GS fractional velocity, calculated as active GS divided by total GS, was unchanged in HiCHO and LoCHO in Phases 2 and 3 when compared to Phase 1. HK was also unchanged in both groups at the end of Phases 2 and 3. GLY was unchanged in both treatment groups after Phase 2, but after Phase 3 GLY was increased ($P < 0.01$) in HiCHO (658 ± 37 mmol/kg dm) when compared to LoCHO (533 ± 41 mmol/kg dm). There was no change in Glut-4 throughout the study in LoCHO whereas Glut-4 was increased ($P < 0.01$) in HiCHO after Phases 2 and 3 when compared to Phase 1 such that there was a significant difference ($P = 0.002$) in Glut-4 expression between HiCHO (1.1 ± 0.1 arbitrary units) and LoCHO (0.6 ± 0.05 arbitrary units) following physical conditioning. This study indicated that dietary energy source affects exercise training-associated alterations in glycogen storage and Glut-4 expression in equine skeletal muscle.

Key Words: Horse, Exercise training, Glucose metabolism

W90 Temporal variables of the trot of the hunter pleasure Arabian performance horse. M. Nicodemus* and K. Slater, *Mississippi State University, Mississippi State*.

The Arabian Horse is the oldest pure bred and considered the foundation breed for all other breeds, yet research concerning the Arabian horse gait is lacking. Most of the kinematic research of the trot focuses on the European dressage horse, which has proven to be helpful in both performance and clinical applications. Therefore, the objective of this study was to define the trot of the hunter pleasure Arabian performance horse using temporal variable measurements. 4 registered Arabian horses with championship bloodlines actively showing and placing at the national level of breed recognized shows in the hunter pleasure division were recorded at 60 Hz by a single camcorder placed perpendicular to the horse's plane of travel, at a height level with the horse's topline, and at a distance that allowed for recording of one full stride. Horses were ridden at a trot by a nationally ranked Arabian trainer on a packed, dirt surface where all hooves could be seen clearly. Frame-by-frame analysis determined hoof contact and lift-off. Horses had a velocity of 2.36 ± 0.07 m/s with a stride duration of 718 ± 16 ms and stride length of 1.70 ± 0.04 m. The trot was a leaping (Suspension: $16 \pm 3\%$ of stride) gait with the majority of the stride spent in swing (Stance: fore- $40 \pm 3\%$, hind- $44 \pm 1\%$). Paired t-tests confirmed gait symmetry, as there was no significant differences ($P > 0.05$) found between the left and right limbs during the stance phase. The limbs moved as diagonal pairs (Diagonal advanced placement: $0 \pm 0\%$, Diagonal advanced lift-off: $0 \pm 0\%$, Lateral advanced placement: $53 \pm 1\%$, Lateral advanced lift-off: $50 \pm 2\%$) with the body being supported by diagonal limb pairs ($84 \pm 3\%$) while not in flight. Research subjects were limited to nationally ranked horses in which further studies may find differences in hunter performance based on training level as was found in earlier studies on the European dressage horse. Comparison of the hunter pleasure Arabian performance horse trot with earlier kinematic studies of the European dressage horse find apparent differences between breeds and between performance types suggesting further kinematic research is needed.

Key Words: Arabian Horse, Hunter pleasure, Temporal variables

W91 Parameter estimates for genetic effects on conformation traits of Korean jeju native horse. W. Y. Oh^{*1}, D. J. Choi², M. S. Kang², J. W. Lee³, C. E. Lee¹, and D. H. Baik⁴, ¹National Jeju Agricultural Experiment Station, Rural Development Administration, Jeju City, Jeju Island, Republic of Korea, ²Dept. of Animal Science and Biotechnology, Faculty of Bioscience and Industry, College of Applied Life Science, Jeju City, Jeju Island, Republic of Korea, ³Animal Genomics and Bioinformatics Division, National Livestock Research Institute, Suwon city, Gyeonggi, Republic of Korea, ⁴Department of Animal Resources and Biotechnology, College of Agriculture, Chonbuk National University, Chonju city, Chonbuk Province, Republic of Korea.

Data (N =1,289) were collected from 2001 through 2005 on Korean native horse called Jejuma by the evaluations of Jeju horse commission to estimate genetic parameters for head length, withers height, back height, croup height, body length, chest depth, chest width, hip width, croup width, croup length, chest girth, and cannon circumference as conformation traits of a horse. Estimates of heritability and genetic correlations of these traits were obtained with derivative - free REML. Model included animal genetic and residual random effects. For 12 conformation traits, sex, age, and registration status were used as a fixed effect. For the sex effect, there were few quantifiable differences between mares and stallions. Non - registered horses were much higher and lengthier than those of registered horses. Single-trait analyses were initially done to obtain starting values for multiple-trait analyses. Estimates of heritability for 12 body measures were moderate to high and for the height traits (withers height, back height, and croup height) were moderate (.45 ~.55). The lowest estimate was found for the hip width (.08) while highest values were chest width and body length (.72 ~ .62). Estimates of genetic correlations between cannon bone circumference and head length and withers height and back height were .80 and .98, respectively.

Key Words: Korean native horse, Conformation traits, Genetic parameters

W92 The effect of biologically relevant concentrations of glucosamine and chondroitin on stressed equine cartilage explants. R. S. Harlan, P. S. Chan, J. P. Caron, and M. W. Orth^{*}, Michigan State University, East Lansing.

Glucosamine (GLN) and chondroitin sulfate (CS) have gained popularity for treatment of joint pain and inflammation. We tested biologically relevant concentrations of GLN and CS for their ability to mitigate inflammatory responses in equine cartilage explants. Cartilage (6 mm disks) was collected from carpal joints of horses euthanized for reasons other than lameness and placed into culture plates. Three culture schemes were used: 1) Interleukin-1 (IL-1; 50 ng/ml) with and without GLN + CS (non-impact); 2) IL-1 plus mechanical stress (peak load of 15 MPa in 50 ms) with and without GLN + CS (impact); 3) explants were cultured for two weeks with no mechanical stress and exposed to IL-1 on d 4 and d 10 (long term). Each experiment included an untreated (negative) control group and a positive control of IL-1 alone. The non-impact model tested two concentrations: 1 ug/ml GLN + 5 ug/ml CS (low dose); 5 ug/ml GLN + 20 ug/ml CS (high dose). Impacted specimens were exposed to only the high dose combination. The two-week experiment included the low and high doses of GLN + CS. Nitric oxide (NO) and prostaglandin E₂ (PGE₂) were measured as indicators of inflammation. Proteoglycans in the media were measured as an indicator of cartilage turnover. Cartilage explants at the conclusion of the experiment were digested and assayed for proteoglycan content. Each culture scheme was repeated at least 3 times with cartilage from

different horses. Differences were considered significant at $p < 0.05$ using one-way ANOVA. In the non-impact model, GLN + CS had no effect. When mechanical impact was combined with IL-1, NO production with the GLN + CS treatment was reduced to control levels. Proteoglycan release was also significantly lower in the GLN + CS treatment than the IL-1 + impact positive controls. The long term-cultures showed a trend ($p = 0.08$) for a decrease in NO production in the low dose of GLN + CS + IL-1 compared with IL-1-only. In none of the models was PGE₂ synthesis reduced by GLN +CS. Under these culture conditions, GLN +CS modulate elements of the stress-induced, inflammatory response of equine cartilage.

Key Words: Arthritis, Nutraceutical, In vitro

W93 Caprylic acid: A potential antimicrobial against *Dermatophilus congolensis* infection in horses. S. Valipe^{*}, A. Annamalai, J. Nadeau, and K. Venkitanarayan, University of Connecticut, Storrs.

Dermatophilus congolensis is a gram-positive bacterium that causes "rain rot" a common skin infection in horses. The disease condition results in significant economic losses to horse owners due to its deleterious effect on the performance of affected animals. The widespread use of antibiotics to treat specific bacterial infections in livestock has resulted in the emergence of multi-drug resistant strains of pathogenic bacteria. Thus, there is a need for safe and effective antimicrobial alternatives to antibiotics for treating bacterial diseases in animals. Caprylic acid (CA) is a natural, eight-carbon fatty acid present in breast milk and coconut oil, and is a food-grade chemical approved by the Food and Drug Administration as generally regarded as safe. The objective of this study was to determine the antibacterial effect of caprylic acid, monocaprylin (monoglyceride ester of caprylic acid), and sodium caprylate on *D. congolensis*. Brain heart infusion (BHI) containing caprylic acid (0 mM, 7.5 mM, 12.5 mM, 15 mM, and 17.5 mM), monocaprylin (0 mM, 2.5 mM, 5 mM, and 7.5 mM) or sodium caprylate (0 mM, 15 mM, 50 mM, 60 mM, and 70 mM) was inoculated separately with three strains of *D. congolensis*, and incubated at 37°C for 48 h under anaerobic conditions. Following incubation, the surviving population of *D. congolensis* in each sample was determined by plating 0.1-ml portions of the broth directly or after serial 10-fold dilutions on BHI agar plates. Triplicate samples of each treatment and control were included and the study was replicated three times. The three lipid molecules exerted substantial antimicrobial effect on all three stains of *D. congolensis*. The mean minimum inhibitory and bactericidal concentrations of caprylic acid, monocaprylin and sodium caprylate on *D. congolensis* were 7.5 and 15 mM, 2.5 and 7.5 mM, and 15 and 75 mM, respectively. Results indicate caprylic acid and its derivatives could potentially be used for treating and controlling *D. congolensis*, but validation studies in animals are needed before recommending their application.

Key Words: *Dermatophilus congolensis*, Dermatophilosis, Horses

W94 The effect of sedation on serum cortisol concentration in mares during weaning. B. Cassill^{*}, S. Hayes, J. Ringler, and L. Lawrence, University of Kentucky, Lexington.

Several studies have examined the effect of weaning practices on foals but less is known about the stress experienced by mares at weaning. Sedating mares during the weaning process is a practice that is widely used. This study was conducted to determine if sedation would decrease cortisol levels (an indicator of stress) in mares during weaning. The study used 19 Thoroughbred and Quarter Horse mares (average age 11 ± 4.3 y). Eleven mares (Group N) were weaned without

sedation and eight mares (Group S) were weaned after sedation with acepromazine maleate (0.03-0.04 mg/kg of BW, IV). On the day of weaning, blood samples were collected from mares prior to initiating the weaning process. Mares and foals were abruptly separated by transporting the mares to a different location on the farm. Group S mares were sedated prior to transport. Blood samples were collected 1, 2 and 7 d following weaning. All blood samples were collected before 0900 to limit diurnal variation. Serum was analyzed for cortisol using radioimmunoassay. Cortisol concentration increased from day 0 to day 1 ($P = 0.0014$) but decreased to original levels on day 2. Cortisol concentration in serum was not affected by sedation ($P = 0.8504$). There were no differences in the cortisol concentrations between young mares (5 – 11 y of age) and older mares (13 – 18 y of age) ($P = 0.9069$) nor were there any differences in the % change of cortisol concentrations from day 0 to day 1 ($P = 0.3882$). In addition, change in cortisol concentration was not different between multiparous ($n = 16$) and primiparous mares ($n = 3$) ($P = 0.2236$). In conclusion, cortisol concentration was not affected by sedation or the age of the mares.

Key Words: Horse, Weaning, Stress

W95 Effect of yeast culture supplementation on digestibility of varying quality forage in mature horses. L. M. Morgan^{*1}, J. A. Coverdale¹, M. A. Froetschel¹, and I. Yoon², ¹University of Georgia, Athens, ²Diamond V Mills, Inc., Cedar Rapids, IA.

Supplementation of yeast culture has yielded variable results in many species, particularly when fed to horses. Improving the digestibility of lower quality forages could be advantageous both for the producer and horse health. The objective of this study was to evaluate the effect of non-viable *Saccaromyces cerevisiae* on digestibility of high and low quality forage in mature horses. Sixteen geldings (483.6 ± 25.5 kg and 6.8 ± 3.2 yr), of Quarter Horse ($n = 14$) and Thoroughbred ($n = 2$) breeding, were used in a 4 x 4 Latin Square design with 28-d treatment periods. Russell bermudagrass hay of either high (13.1% CP, 73.1% NDF, 35.3% ADF and 6.0% ash) or low (8.1% CP, 75.3% NDF, 37.6% ADF and 4.3% ash) quality was offered at 1.35% of BW (DM). Diets consisted of high quality forage with the addition of yeast culture (HY), high quality forage without yeast culture (HC), low quality forage with the addition of yeast culture (LY), and low quality forage without yeast culture (LC). All horses were fed a commercial grain mix (12.6% CP, 25.4% NDF, 12.1% ADF and 4.0% ash) offered at 0.45 % of BW (DM) daily. *Saccaromyces cerevisiae*, was added to grain during the morning feeding at a rate of 56 g per horse. BW was measured weekly and feed intake was adjusted accordingly. Total fecal collections (3 days) were made at the end of each treatment period. Fecal samples were obtained every 6 hr and 10% of the total amount was frozen for later analysis. Horses receiving low quality hay (LY and LC) had greater intake expressed as a percentage of BW compared to horses receiving high quality hay (HY and HC) ($P < 0.01$). There was no influence of yeast culture supplementation on intake of grain or forage ($P = 0.23$ and $P = 0.62$ respectively). DM, OM, CP and NDF digestibilities were greater in the diets HC and HY compared to LC and LY ($P < 0.01$, $P < 0.01$, $P < 0.01$ and $P < 0.01$ respectively). DM, CP and NDF digestibilities were greater for horses receiving LY compared to LC ($P < 0.09$, $P < 0.03$ and $P < 0.05$ respectively). Supplementation of yeast culture to mature horses improved digestibility of lower quality bermudagrass hay.

Key Words: Horse, *Saccaromyces cerevisiae*, Digestibility

W96 Nutrient composition of stall waste produced by Florida horse operations. D. L. Cotton^{*}, L. K. Warren, R. A. Nordstedt, J. Kivipelto, and S. C. Dilling, University of Florida, Gainesville.

Data describing the composition of horse stall waste is limited; however, this information could serve as a useful reference for making nutrient management decisions. The objectives of this study were to characterize the composition of stall waste generated by Florida horse operations and to identify management factors that affect the nutrient content of stall waste. Samples of clean bedding and soiled stall waste were gathered from breeding farms (BREED; $n=40$), boarding and training facilities (BOARD; $n=40$) and racetrack stables (RACE; $n=45$) evenly distributed throughout the state of Florida. Material removed during the most recent cleaning of stalls was thoroughly mixed and random grab samples were collected to represent stall waste at each facility. Samples were analyzed for total carbon (C), total nitrogen (N), and total phosphorous (P). Each facility was also questioned about their stall cleaning practices. Across facilities, the most widely used bedding was wood shavings (75%). Hay or straw bedding was utilized by 4% of BOARD, 25% of BREED and 33% of RACE. Clean hay or straw bedding had greater N ($P<0.001$) than clean wood shavings, but the C content of these beddings was similar. On average, stall waste contained $41.8 \pm 0.8\%$ C, $0.69 \pm 0.03\%$ N, and $0.88 \pm 0.1\%$ P. Stall waste from BREED had greater N than BOARD ($P<0.05$) and RACE ($P<0.01$). Stall waste from BOARD had greater P ($P<0.01$) and N ($P<0.05$) than RACE. The C content of stall waste was not different between facilities. The C:N ratio of stall waste was lower in BREED than in BOARD ($P<0.05$) or RACE ($P<0.01$). Across facilities, the C:N ratio of stall waste was lowest ($P<0.001$) with straw or hay bedding (34:1) compared to stall waste with wood shaving bedding (73:1). Stalls were cleaned less frequently on BREED ($P<0.01$) compared to BOARD or RACE. Although bedding type contributed to the differences in stall waste composition between facilities, stall cleaning practices likely had a large impact on the nutrient content of stall waste. Cleaning stalls more frequently may result in the removal of a greater proportion of bedding to manure, which would lower the N and P content of stall waste.

Key Words: Stall waste, Horse farm waste, Horse manure

W97 Circadian variation of pasture NSC and insulin concentrations in horses. B. Byrd^{*1}, K. Treiber¹, D. Kronfeld¹, W. Staniar¹, R. Geor¹, and P. Harris², ¹Virginia Polytechnic Institute and State University, Blacksburg, ²WALTHAM Centre for Pet Nutrition, Melton Mowbray, UK.

Nonstructural carbohydrates (NSC) in pasture may affect insulin dynamics, providing a possible link between NSC and laminitis. We evaluated circadian variation of NSC in spring pasture, quantified the relationship between pasture NSC and circulating insulin in grazing horses, and compared insulin in grazing horses to horses restricted to hay. Fourteen Thoroughbred mares were assigned to pasture ($n = 10$) or hay ($n = 4$). Grazing horses were kept on a 5 hectare pasture. Jugular catheters were inserted at 0600. Hourly samples were collected for 36 h, with pasture sampling from 0600 and blood sampling from 0930. Pasture NSC was determined as the sum of water soluble carbohydrate (WSC) and starch. Plasma insulin was measured by immunoassay. Dietary groups were compared by ANOVA with repeated measures, relationships between NSC and insulin in grazing horses were quantified by regression, and circadian patterns in NSC and insulin were quantified by nonlinear regression fitting sine waves. Pasture NSC was lowest around 0430 ($17.6 \pm 0.3\%$), and highest around 1630

($22.2 \pm 0.3\%$). Hay NSC was $8.9 \pm 0.05\%$. Insulin concentrations were higher in grazing horses than in horses restricted to hay ($P = 0.012$). Group mean insulin concentrations of grazing horses and NSC levels in the pasture were related ($r^2 = 0.032$, $P < 0.001$). Individual mean insulin response was proportional to the increase in insulin per unit of NSC ($r^2 = 0.601$, $P = 0.008$). Sinusoidal circadian patterns in NSC ($r^2 = 0.507$, $P < 0.001$) and insulin in grazing horses ($r^2 = 0.121$, $P < 0.001$) had similar frequency ($P = 0.36$), with changes in insulin delayed by 30 min. The percent change in insulin was 2.5 times that of NSC. The circadian patterns in NSC were attributable to WSC which comprised 93%, and there was no evident pattern in starch (7%). This study indicates that circulating insulin in grazing horses is associated with circadian variation in pasture NSC.

Key Words: Horse, NSC, Insulin

W98 Seasonal variation in cool season grasses. L. Lawrence^{*1}, S. Hayes¹, R. Allman², and G. Rich³, ¹University of Kentucky, Lexington, ²The Farm Clinic, Lexington, KY, ³Rich Equine Nutrition Consulting, Memphis, TN.

Pasture is an important nutritional resource on Central Kentucky horse farms, however both pasture availability and pasture composition will vary during the year. The purpose of this study was to identify variations in the nutritional composition of cool season pasture grasses commonly found in horse pastures. Samples of cool season grasses (tall fescue, orchard grass and blue grass) were collected from Central

Kentucky horse pastures every month for 5 y (2000-2004). Pastures were maintained on fall fertilization schedules based on soil sampling and were regularly clipped to maintain a forage height below 25 cm. Samples were analyzed for crude protein (CP), acid detergent fiber (ADF), calcium (Ca), and phosphorus (P). Digestible energy (DE) content was estimated from CP and ADF concentration (NRC, 1989). Mean values were calculated across all months, plant types and years and also by month across years and plant types. Across all years and months the cool season pastures sampled in this study contained $20.1 \pm 4.4\%$ CP, $28.6 \pm 4.9\%$ ADF, $0.46 \pm 0.08\%$ Ca and $0.41 \pm 0.08\%$ P, on a dry matter basis. Concentrations of CP, ADF, Ca and P were affected by month ($P < 0.05$). Pasture quality, based on CP and estimated DE, increased in the spring, decreased in the summer and then increased again in the fall. Mean CP concentration (DM basis) ranged from a high of $24.9 \pm 1.7\%$ in April to a low of $14.6 \pm 2.4\%$ in July. Mean CP content exceeded 18% from September through May. Mean ADF concentration ranged from $34.5 \pm 3.6\%$ in July to $21.5 \pm 2.7\%$ in April. Digestible energy was highest in April (3.21 ± 0.17 Mcal/kg) and lowest in July (2.26 ± 0.19 Mcal/kg). Calcium concentration was lowest in the late spring and highest in the fall. For lactating mares and growing horses, calcium intakes of 1.6 to 2 g/Mcal of DE have been suggested (NRC, 1989). During April and May, the Ca:DE ratio in the cool season grasses was below 1.6. Based on these observations, including legumes in Central Kentucky horse pastures may be warranted.

Key Words: Horse, Equine, Pasture

Lactation Biology

W99 Milk yield and udder capacity of cows with different milk concentration milked once or twice daily. D. Clark^{*1}, D. Dalley¹, and S. Davis², ¹Dexel, Hamilton, New Zealand, ²ViaLactia Biosciences, Auckland, New Zealand.

Four per cent of New Zealand's dairy farmers now milk their herds once daily (1x). Jerseys are more tolerant of 1x milking than Holstein-Friesians and the hours worth of udder capacity is greater for the former. We hypothesized that Holstein-Friesian cows with more concentrated milk would be more tolerant of 1x milking than those producing less concentrated milk. Seventy-two Holstein-Friesian cows were selected as a High milk solid content (fat + protein) group (High MS) and 72 selected as a Low milk solid content group (Low MS). Within each group, 23 cows were allocated to 2x daily milking and 49 cows to 1x daily milking with grazed pasture as the sole feed. Udder capacity was determined as the total volume of milk contained in the udder 40 h after the last milking. Residual milk was removed after an intravenous injection of 10 IU oxytocin. Udder capacity was measured at approximately 90 and 150 days in milk (DIM). Cows milked 1x produced less milk, protein and fat yields and had higher SCC ($P < 0.001$) than those milked 2x. Cows selected for milk solids content did not differ in their milk, protein, fat yield or SCC. There was no milking frequency by milk solids content interaction. Cows milked 2x daily had greater udder capacities at 90 ($P < 0.05$) and 150 DIM ($P < 0.07$) than those milked 1x daily. High MS cows had lower udder capacities at 90 ($P < 0.07$) and 150 DIM ($P < 0.1$) than Low MS cows. Holstein-Friesian cows selected for phenotypically high milk solids content did not produce more milk, protein or fat than those selected for low milk solid content. The latter had 11-16% greater udder capacity when milked 1x daily in early-mid lactation and this

may have compensated for their lower milk solid content. We conclude that milk solid content in the previous lactation is not an effective way of identifying cows that will adapt well to 1x daily milking.

Key Words: Milking frequency, Udder capacity, Pasture

W100 Effects of milking interval on milk constituents from various fractions of ewe milk. A. Dzidic^{*1}, M. Kaps¹, and R. Bruckmaier², ¹University of Zagreb, Zagreb, Croatia, ²University of Bern, Bern, Switzerland.

The aim of this study was to evaluate the effects of milking interval (8 and 16 h) on milk constituents (fat, protein, lactose and dry matter percentage, and somatic cell count) in different milk fractions in Istrian x Awassi x East Friesian crossbreed ewes. Milk fraction samples of 20 ewes were collected during morning and evening milking in early lactation after 25% (M25), 50% (M50), 75% (M75) and 100% (M100) of main milk yield, and machine stripping fraction (MS) when milk flow decreased below 100 g/min from the whole udder. For the statistical analysis, a repeated measures model was used with ewe as a random effect and milking time, peak flow rate, total milk yield, milking interval and milk fraction nested within milking interval defined as fixed effects. The relationships between milk fractions and constituents within milking interval were tested by using linear, quadratic and cubic contrasts. The fat content during main milking ranged from 5.81 to 6.30 % and from 3.00 to 5.70 % after the 8 and 16 h from previous milking, respectively. Compared to the main milk fractions, the MS fraction fat content was higher ($P < 0.05$) after both milking intervals. Protein, lactose and dry matter did not change ($P > 0.05$) through the main milking fractions in both milking intervals. In