590±17 and 547±18 g/d, respectively (P<0.05). Supplementing with 1 kg millet bran/d in the previous dry season decreased (P=0.02) ADG during the rainy season by 78.5±3.3 g/d. Cows in transhumance tended to gain more weight during the post-harvest season than those under the sedentary system (435±23 vs 383±22 g/d, P=0.09). Cows receiving 0, 360 and 720 g/d supplement during the end of the dry season weaned 0.37, 0.44 and 0.49 calves/yr (SEM=0.04; P=0.09). Supplementation decreases weight losses in the dry season and this effect is partially offset by lower gains during the following rainy season. Transhumance of cattle complements feed resources between the cultivated and pastoral zones, but does not affect weight changes or reproductive performance.

Key Words: Transhumance, Supplementation, Cattle

63 Effects of the recessive naked gene on postweaning fryer performance and thermo-tolerance characters in rabbits. A. D. Rogers* and S. D. Lukefahr, *Texas A&M University-Kingsville*.

This study investigated the effects of the naked gene on postweaning trait performance and thermo-tolerance characters in rabbit fryers during a 42-d growth phase in the summer of 2002 in subtropical south Texas. In 1999, a rare naked rabbit was born in El Campo, TX. "Fuzz", a Mini Lop rabbit, was mated to commercial New Zealand White does at Texas A&M University at Kingsville, which resulted in 16 F_1 litters and 113 offspring, all of which had normal fur coats. To reproduce the recessive naked gene in the homozygous state, F_1 x F_1 *inter se* matings were made between half-siblings to create an F_2 generation. In the F_2 generation, 91 weaned fryers from 18 fraternal litter groups were produced. Based on an expected 3:1 phenotypic ratio (furred to naked classes), 70 rabbits had normal fur coats and 21 rabbits were naked. Most litters produced some naked and furred kits. Fryers were randomly assigned to growing pens containing either two or three non-littermate furred or naked rabbits. Individual fryer traits included initial and final body weights and ADG, as well as respiratory rate, rectal body temperature, and ear length, which were recorded at the end of the study. Pen traits included feed intake as an indicator of feed appetite. Data were blocked for effects of fraternal-litter, random pen (within naked and furred groups), age batch, gender, and initial age of fryer as a linear covariate when analyzing body weight traits. Results consisted of naked fryers being 212 g heavier and having 2.69 g/d more rapid ADG than furred rabbits (P<0.001). Initial ear length was generally associated (P<0.01) with more rapid ADG (linear regression of 0.165±0.05 cm per g/d). Naked fryers had lower rectal body temperature (38.9 and 39.7°C; P<0.001) and had lower respiratory rate (119.7 and 160.6 bpm; P<0.001) at 1400 h compared to furred rabbits, respectively. In addition, pens of naked fryers had higher daily feed appetites by 28.8±4.5 g per fryer than pens of furred rabbits (P<0.001). Our results indicate that naked rabbits had better thermo-regulation ability than furred rabbits. Based on these promising results, plans for developing a new breed of naked rabbits is justified, which has the potential to contribute more meat and income for subsistence families in tropical regions.

Key Words: Rabbits, Thermoregulation, Tropical Agriculture

64 Study of some socioeconomic factors affacting small ruminant production in upland ranges of Balochistan. A. U. Hyder*[1], A. S. Lodhi[2], and O. U. Haider[3], [1]*Department of Animal Breeding and Genetics, University of Agriculture, Faisalabad, Pakistan,* [2]*Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, Pakistan,* [3]*Department of Agriculture, Qutta, Pakistan*.

This study comprised 120 sample farmers who were interviewed, out of which 32, 70 and 18 were from nomads, transhumants and sedentary people, respectively. The literacy rate of nomads, transhumants and sedentary respondents were 1.4 percent, 18.6 percent and 27.8 percent in the study areas, while overall percentage of educated individuals was 15.8. The mean family size of the nomads, transhumants and sedentary respondents was 10.6, 12.5 and 17.3 family members, respectively. Their mean family size for all categories of respondents was 12.7 heads with the standard deviation of 5.73 heads. Almost all the roads were unpaved and unsafe in the rainy season. The overall mean distance from the metallic roads was 24.7 km. The overall mean distance from the livestock market was 32.2 km while the veterinary hospital on an average was 28.1 km away from the sample farmers in the study area. Surface wells, tube-well and karez were the major source of water in the target areas. Only 6.6 percent respondents had off farm income source while 26.2 and 67.2 percent were obtaining from agriculture and from livestock in sample areas, respectively. Nomads have no irrigated land, transhumant and sedentary respondents on average had 14.6 acres and 26.9 acres respectively. Overall, sailaba (rainfed) and khuskaba (small dams are constructed for irrigation) land holdings were 24 acres while irrigated land was 12.6 acres. Goats and sheep farming was dominant in the study area.

Key Words: Socioeconomic factor, Small ruminants production

65 Small ruminant production in upland ranges of Balochistan-cost of enterprise. A. U. Hyder*[1], A. S. Lodhi[2], and O.U. Haider[3], [1]*Department of Animal Breeding and Genetics, University of Agriculture, Faisalabad, Pakistan,* [2]*Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, Pakistan,* [3]*Department of Agriculture, Qutta, Pakistan*.

A survey study for the economic evaluation of different husbandry systems being practiced in Balochistan province of Pakistan was carried out during the year 2001-02. This study comprised 120 sample farmers out of which 32, 70 and 18 were from nomad, transhumant and sedentary husbandry systems, respectively. The stratification was based on the proportion of the farming population. The overall total annual production cost per flock was Rs. 46403.6 (1 US dollar = Rs. 58) . The feeding/fodder, shepherd, grazing, health cover, shearing, marketing and miscellaneous costs were Rs. 24622.8, Rs. 12359.0, Rs. 2751.8, Rs. 3542.3, Rs. 844.1, Rs. 1430.8 and Rs. 892.6, respectively. Overall average consumption and social use was 9.0 percent of the total mean flock size. Nomads, transhumants and sedentary were marketing 27.5, 24.0 and 25.9 percent of mean flock size. Overall animals marketed were 25.0 percent of the total mean flock size. Nomads marketed 27.5 percent of their total flock, while sedentary and transhumant 24.0 percent and 25.9 percent, respectively. The overall total income from the mean flock size was calculated as Rs. 112282.0/annum. Overall average gross income was Rs. 112282.0. The Net income became Rs. 65878.4 per annum. The gross income, cost and net revenue per-animal under nomadic husbandry systems was Rs. 827.5, Rs. 294.2 and Rs. 560.1; under transhumant husbandry system, it was Rs. 918.8, Rs. 331.5 and Rs. 587.4; and under sedentary husbandry system it was Rs. 1258.5, Rs. 515.6 and Rs. 741.6, respectively. Overall benefit cost ratio was 2.4:1, however, for nomad, transhumant and sedentary husbandry systems, the benefit cost ratio were 2.8:1, 2.8:1 and 2.4:1, respectively. The poverty alleviation tools like government assistance in the form of micro-credit schemes during off season can play dramatic role in economic uplift of these lifestyles.

Key Words: Small ruminant production, Cost of enterprise

Nonruminant Nutrition: Sow nutrition

66 Nucleotides in sows colostrum and milk at different stages of lactation. C. D. Mateo*, H. H. Stein, and D. N. Peters, *South Dakota State University, Brookings, SD*.

An experiment was conducted with the objective of measuring the concentrations of CP and 5' monophosphate nucleotides (i e., 5'AMP, 5'CMP, 5'GMP, 5'IMP, and 5'UMP) in sows' colostrum and milk. Twelve multiparity sows (Landrace x Yorkshire x Duroc) were used in the experiment. Litter size was standardized at 11 piglets for all sows on the day of farrowing. Sows were fed an 18% CP corn-soybean meal diet throughout lactation. The experimental period comprised the initial 28 d of lactation with colostrum being collected within 12 h of farrowing and milk being collected on d 3, 7, 14, 21, and 28. Milk samples were analyzed for CP and 5'AMP, 5'CMP, 5'GMP, 5'IMP, and 5'UMP. The CP linearly decreased (P < 0.01) from 16.6% in colostrum to 7.7,

6.2, 5.5, 5.7, and 6.3% in milk collected on d 3, 7, 14, 21, and 28, respectively. The concentrations of 5' AMP, 5'CMP, 5'GMP, and 5'IMP increased from d 0 to d 3 and d 7 and then decreased during the remaining lactation period (cubic effect, $P < 0.05$). The concentration of 5'UMP decreased linearly ($P < 0.01$) from d 0 to d 28 of lactation. In colostrum, 5'UMP represented 98% of all 5' monophosphate nucleotides and in milk, 5'UMP accounted for 86-90% of all nucleotides, regardless of d of lactation. The results of this experiment indicate that the concentration of 5' monophosphate nucleotides in sows milk decline as lactation advances. In addition, 5' UMP is the most abundant nucleotide in colostrum and milk from lactating sows.

	Day of lactation						*P-values*		
Item	0	3	7	14	21	28	Linear	Quadratic	Cubic
CP	16.6	7.8	6.2	5.5	5.7	6.3	<0.0001	<0.0001	<0.0001
5'AMP	4.0	11.3	12.8	6.8	4.3	3.0	0.0181	0.0435	0.0152
5'CMP	1.5	7.2	7.1	3.5	2.3	2.5	0.1245	0.1312	0.0041
5'GMP	5.4	14.7	14.0	10.2	6.0	7.1	0.0818	0.0675	0.0024
5'IMP	1.1	1.8	2.6	1.4	0.9	0.4	0.0217	0.0526	0.0439
5'UMP	555.6	305.5	263.1	144.0	122.8	104.0	<0.0001	<0.0001	0.0002

Key Words: Nucleotides, Sow, Milk

67 Impact of milk supplementation on primiparous and multiparous females' performance and piglets' growth during pre and post-weaning periods.

M. E. Johnston[1], R. Cabrera*[2], R. D. Boyd[1], and J. Vignes[3], [1] *The Hanor Company,* [2] *Ralco-Mix Products, Inc.,* [3] *Advanced Birthright Nutrition, Inc.*

This study was conducted to determine the impact of milk supplementation on gilts, sows, and their progeny's performance during lactation and post-weaning. A total of 112 females (56 gilts, 56 sows) were allotted to one of two treatments: milk supplemented (MS) or non-supplemented (NS) with 28 gilts and 28 sows in each treatment. All litters were standardized to 11.1 pigs/litter. Milk supplementation of litters started 12-24 h after farrowing with acidified, medicated milk replacer fed ad libitum. Gilts and sows' BW and backfat depth were measured 24 h after farrowing and at weaning. ADFI was recorded. Lactation length was 18.2 d for gilt litters and 19.2 d for sow litters. Pigs were weighed 24 h after birth and at weaning. Pre-wean mortality and ADG were recorded. MS and NS gilts weight change, backfat depth change, and ADFI did not differ between treatments ($P > 0.05$). The number of pigs weaned did not differ ($P > 0.05$) between MS and NS gilt litters (10.1 vs. 10.0, respectively). Birth and weaning weights (5.62 vs. 5.35 kg) were 0.09 and 0.27 kg heavier, respectively ($P < 0.05$) for MS compared to NS gilt litters. MS and NS sows' BW change and ADFI did not differ between treatments ($P > 0.05$). However, MS sows lost 1.3 mm more backfat than NS sows ($P < 0.05$) during lactation. The number of pigs weaned for MS sow litters was 0.9 pig/litter higher ($P < 0.05$) than NS sow litters (10.6 vs.9.7 pigs/litter, respectively). Birth and weaning weights (6.58 vs. 5.99 kg) were 0.09 and 0.59 kg heavier, respectively ($P < 0.05$) for MS sow litters when compared to NS sow litters. After a 42-d nursery period, MS pigs were 0.8 kg heavier ($P < 0.001$) than NS pigs (23.4 vs. 22.6 kg, respectively). These data suggest milk supplementation during lactation reduces piglet loss and increases piglet weaning weight. The advantage in weaning weight for milk supplemented pigs is maintained through the nursery period.

Key Words: Milk supplementation, Pig wean weight, Pre-wean mortality

68 Effects of reducing particle size of corn in lactation diets on performance and nutrient utilization in multiparous sows.

E. C. Baudon*, J. D. Hancock, M. D. Tokach, and J. F. Gabarrou, *Kansas State University, Manhattan.*

Eighty multiparous sows (parities one to four) were used to determine the effects of particle size of corn in lactation diets on sow and litter performance. The sows were fed corn-soybean meal-based diets with targeted corn particle sizes of 1,500, 900, and 600 m (actual mean particle sizes during the experiment were 1,609, 849, and 630 m). Particle size did not affect BW gain and survivability in piglets and BW loss, weaning to estrus interval, and fecal moisture in sows ($P > 0.10$). However, loss of backfat (quadratic effect, $P < 0.001$) was lowest in sows fed the diet of intermediate particle size. Average daily water intake increased as particle size was decreased from 1,500 to 600 m (linear effect, $P < 0.03$). Also, intakes of DM, N, and GE were increased by 11, 8, and 12% and apparent digestibilites of DM, N, and GE were increased by 5, 4, and 5%, respectively, as particle size of corn was decreased (linear effects, $P < 0.007$). There was greater feed intake (linear effect, $P < 0.04$) and daily absorption of DM, N, and GE were increased by 16, 12, and 17% (linear effects, $P < 0.001$) as corn particle size was reduced from 1,500 to 600 m. Finally, excretion of DM in the feces was decreased (linear effect, $P < 0.09$) by 84 g/d as particle size was reduced. In conclusion, reducing particle size of corn did not affect sow and litter performance but increased digestibility of nutrients and reduced nutrient excretion.

	Particle size, μm				Probability	
Item	1,500	900	600	SE	Linear	Quadratic
No. of observations	29	23	28	-	-	-
ADFI, kg	5.30	5.33	5.84	0.17	0.04	NS
Daily water, L	33.9	40.4	50.6	5.1	0.03	NS
Sow BW loss, kg	9.8	3.2	6.6	2.5	NS	NS
Litter BW gain, kg	42.9	43.5	46.0	1.8	NS	NS
DM dig, %	80.0	82.5	83.6	0.7	0.001	NS
N dig, %	82.9	85.4	85.9	0.8	0.007	NS
DM excretion, g/d	931	821	847	35	0.08	NS
N excretion, g/d	27.2	24.4	24.7	1.2	NS	NS

Key Words: Particle size, Sows, Nutrient digestibility

69 The effect of canola on reproductive performance in sows.

M. R. Smiricky-Tjardes*, H. H. Stein, and D. N. Peters, *South Dakota State University.*

Studies in Europe have reported increases in the litter size of sows when canola-based diets are fed. Therefore, it was the objective of this experiment to investigate the effects of including either full fat canola or canola meal in diets fed to gestating and lactating swine. A total of 60 gestating sows (avg. parity = 3) were randomly allotted to one of three treatment groups: 1) corn and soybean meal control diet; 2) corn and canola meal diet; and 3) corn and full fat canola diet. Gestation diets were formulated to contain 14% CP and lactation diets to contain 18% CP. During gestation, all sows were fed 7,000 kcal/d of their respective treatment diet. During lactation, all sows were allowed ad libitum access to their treatment diets. Feeding of the experimental diets began right after breeding and continued through two reproductive cycles. Reproductive performance parameters were collected through both reproductive cycles. There was no effect of reproductive cycle on any of the response criteria measured in this study. Sows consuming the full fat canola diet gained less weight ($P < 0.05$) during gestation than sows consuming the other two diets. However, they also lost less ($P < 0.05$) weight during lactation when compared to sows consuming the canola meal diet. The number of pigs born alive was higher ($P < 0.05$) for sows consuming either the corn-soybean meal or corn-full fat canola diet when compared to sows consuming the corn-canola meal diet. The number of stillborns, mummies, weight of pigs born alive, and litter birth weight did not differ ($P > 0.20$) between dietary treatments. The number of pigs weaned and the litter weaning weight was greater ($P < 0.05$) for sows consuming the corn-soybean meal than sows consuming the canola meal diet. Lactation feed intake was lower ($P < 0.05$) in wk 2, 3, and overall for sows consuming the corn-canola meal diet when compared to the other two diets. Finally, return to estrus interval was not affected ($P > 0.20$) by dietary treatment. In conclusion, full fat canola-based diets performed similarly to standard corn-soybean meal diets when fed to gestating and lactating sows. The deleterious effects of the corn-canola meal diet warrant further investigation prior to incorporation into sow gestation and lactation diets.

Key Words: Canola, Sows, Reproduction

70 Exogenous enzyme effects on the digestibility of gestation-lactation swine diets.

A.L.P. de Souza*, M. D. Lindemann, and G. L. Cromwell, *University of Kentucky, Lexington.*

The effects of two commercial enzyme products on the ileal and total tract nutrient digestibilities in crossbred sows (n=8; BW=196 15 kg) fitted with ileal stainless steel T-cannula were evaluated. The enzyme products contained cellulase and protease activities (Enz 1; VegPro®, Alltech) or xylanase activity (Enz 2; Fibrozyme®, Alltech). A fortified corn-soybean meal control diet (0.81% lysine, 0.73% Ca, and 0.61% P) was fed during gestation and lactation. Trt 1 was the control diet; Trt 2 was the control plus Enz 1 (7,700 HUT of protease activity/kg diet, and 75 CMC of cellulase activity/kg diet), and Trt 3 was the control plus Enz

2 (100 XU of xylanase activity/kg diet). Ileal and fecal samples were collected at Wk 6-7 and Wk 12-13 of gestation and Wk 2-3 of lactation. Females were randomly allotted to a diet in each wk of the collection period. After 5 d adaptation to the diet, ileal samples were collected for a period of 12 h on each of 2 d. Diets were then changed and another collection was made (providing a total of 5-6 observations/diet). Fecal sample collection took place between d 4-7. Apparent digestibility of DM, N, GE, ADF, and NDF was determined using Cr_2O_3. There were no effects (P > 0.10) of the enzyme products on nutrient digestibility during gestation. Ileal digestibilities (%) of DM, N, GE, ADF, NDF during lactation were 77.3, 79.3, 81.7; 81.2, 82.5, 84.3; 79.5, 81.5, 83.8; 37.3, 36.5, 42.3; 75.4, 77.9, 78.6 for Trt 1, 2, and 3, respectively. Total tract digestibilities (%) of DM, N, GE, ADF, and NDF during lactation were 89.8, 90.7, 90.8; 89.0, 90.0, 90.6; 90.7, 91.4, 92.0; 75.0, 66.0, 77.8; 88.2, 89.8, 89.4. Ileal DM (P < 0.02), GE (P < 0.02), and NDF (P < 0.08) as well as total tract DM (P < 0.11) and GE (P < 0.04) digestibilities were improved by Enz 2, and total tract NDF (P < 0.11) was positively affected by Enz 1. Gestational enzyme supplementation was not beneficial; however, the enzyme product containing xylanase activity appears to have potential to increase digestibility of nutrients during lactation.

Key Words: Sows, Digestibility, Enzymes

71 Impact of increased valine:lysine ratio during lactation on sow and piglet performance. A. M. Gaines*[1], M. E. Johnston[2], G. L. Allee[2], R. D. Boyd[2], J. L. Usry[3], and K. J. Touchette[4], [1]*University of Missouri-Columbia,* [2]*The Hanor Company, Inc.,* [3]*Ajinomoto Heartland, Inc., Chicago,* [4]*Merrick's Inc., Union Center, WI.*

This study was conducted to determine the effects of increased valine levels during lactation on sow and piglet performance. A total of 279 PIC C22, C23, and C24 sows (parities 1-5) were allocated by parity to one of four dietary treatments. Diets 1 and 3 were formulated using corn and a fixed inclusion of soybean meal (16.73%). The dietary valine content was increased by adding L-valine with additional synthetic amino acids supplied as necessary to meet minimum amino acid ratios. The total valine:lysine ratio in diets 1 and 3 were 0.73 and 1.25, respectively. Diets 2 and 4 were typical corn- soybean meal diets containing 0.05% L-lysine HCl, with a fixed inclusion of soybean meal (22.68%). The total valine:lysine ratios in diets 2 and 4 were 0.86 and 1.25, respectively, with L-valine used to increase valine content. All diets contained 0.90% total lysine and fed in meal form. Sows were fed ad libitum from d 112 of gestation through a 19-d lactation period and feed intake recorded. Sow body weight was recorded at d 112, after farrowing, and at weaning. Litter size was standardized by 24 h post-farrowing (10.6 0.2 pigs) and pigs were individually weighed at birth and weaning. There was no difference (P = 0.30) in sow feed intake across all dietary treatments. Sows consumed an average of 6.3 kg/d during the 19-d lactation period. Sow weight loss during lactation ranged from 9.4-12.5 kg and was not significantly different (P = 0.61) due to valine:lysine ratio. No dietary treatment effects were observed for body weight at weaning (P = 0.48) or piglet gain (P = 0.38). Furthermore, the number of pigs weaned was not different (P = 0.37) due to valine:lysine ratio. Based on the results of this study, there is no advantage in sow or piglet performance from increasing the valine:lysine ratio.

Key Words: Valine, Lactation, Sows

72 Effect of protected n-3 polyunsaturated fatty acids (Fertilium^{TM}) on litter size in sows. S. K. Webel*, E. R. Otto, D. M. Webel, R. L. Moser, J. D. Spencer, and D. E. Orr, *United Feeds, Inc.*

The effect of diet supplementation with a protected n-3 polyunsaturated fatty acid source (Fertilium^{TM}, United Feeds, Inc. Sheridan, IN) on subsequent reproductive performance in sows (York x Landrace) was evaluated. At a commercial swine farm in Indiana, primiparous and multiparous sows were blocked by parity and randomly assigned to one of two dietary treatment groups (control, n=173 or Fertilium^{TM}, n=165) when entering farrowing rooms, 5 d ± 2 d prior to farrowing. Corn-soybean meal based diets served as control treatments (control lactation diet, 1.22% lysine, 3.22 Mcal/kg ME; control rebreeding diet, 0.80% lysine, 3.11 Mcal/kg ME). Fertilium^{TM} group sows were fed control diets supplemented with 85 g topdress of Fertilium^{TM} once daily. Dietary treatments were administered to sows entering farrowing room, during lactation, and up to 7 d post weaning during re-breeding period (total 35 d). Sows were weaned after 21 d ± 3 d lactation and bred at the first estrus. All sows received a common diet (0.80% lysine, 3.11 Mcal/kg ME) throughout gestation until subsequent farrowing. Subsequent litter size (total born and live born) of farrowed sows was measured and results are presented in Table 1. The number of total born and live born pigs was greater (P<0.05) at the subsequent farrowing for sows topdressed Fertilium^{TM} compared to control sows. The wean to estrus interval and farrowing rate were not different (P>0.10) between treatments. These results show that dietary supplementation of protected n-3 polyunsaturated fatty acids increased litter size when fed to sows for 35 d prior to breeding.

Treatment	Sows Allotted	Sows Farrowed	Days Fed	Subsequent Total Born	Subsequent Live Born
Control	173	117	35	11.0^a	10.3^a
Fertilium^{TM}	165	121	35	11.6^b	10.8^b

^{a,b} Means within column lacking common superscripts differ significantly (P<0.05).

Key Words: Sow, Litter size, n-3 Polyunsaturated fatty acids

Production, Management, & the Environment

73 Evaluation of two evaporative cooling systems for dairy cattle under semi-arid conditions. R. J. Collier*, E. L. Annen, D. E. Armstrong, and A. L. Wolfgram, *University of Arizona,Tucson, AZ.*

Cows(N=80) balanced for parity,stage of lactation and milk yield were randomly assigned to Korral Kool (KK) or oscillating fan and spray (OS) cooling systems from 6/26-9/26,2002. Each pen included a shade structure(7.3 m by 18.3 m)oriented north/south. The KK pen had three overhead coolers, with computer driven variable speed fans and variable pressure water injection into the airstream. The OS pen had three (0.9M)computer driven variable speed fans with variable airstream water injection placed below the western edge of the roof. The arc of the OS fan was 270 °. Both systems varied fan speed and water injection according to THI. Water and electrical use was metered on each system. Water use (L/d)was higher in OS compared to KK (7330 vs 4989, P≤.03). Electrical use (KW/d) was lower for OS compared to KK (76.4 vs 93, P≤.03) Temperature and humidity recorders established THI outside and under each shade. Mean THI outside the shades was 80. Mean THI was higher under OS compared to KK (78 vs 77, P ≤.001). Thermal status of cows was established via infrared gun and visual observation of respiration rate (rr). Average cow surface temperature (°C) was higher for OS compared to KK (34.3 vs 26.6, P≤.001). Likewise rr/min was higher in OS cows compared to KK cows(65.5 vs 56.7, P≤.001) Milk yield (kg/d)N=79, did not differ in OS compared to KK, (36.2 vs 36.7). We conclude that KK improved cow comfort over OS but this did not result in a milk yield difference.

Key Words: Heat stress, Cooling systems, Dairy cattle

74 Effects of sprinkler, shade, and fan cooling of preparturient Holstein cows on postparturient milk performance during summer heat stress. J. H. Urdaz*, M. W. Overton, D. Moore, and J. E. Santos, *Veterinary Medicine Teaching and Research Center University of California, Davis Tulare, CA/USA.*

The purpose of this study was to examine the effects of shades, fans, and sprinklers on the last three weeks of gestation of Holstein cows during summer heat stress. Outcome variables included postparturient milk production, rectal temperatures, body condition score(BCS), and incidence of postparturient disorders. Four hundred and thirty prepartum multiparous cows 250-257 days pregnant were randomly allocated to two identically structured pens. Treatments consisted of sprinklers over the feedbunk (CONTROL, n=209); and sprinklers, fans, and shades over the feedbunk (COOLED, n=221). To be eligible for analysis, cows