

the mix of disciplines involved have added value to what is an animal production problem.

Key Words: Environment, Inter-Disciplinary, Policy

872 Today's poultry industry from a global perspective. P. Aho*, *Poultry Perspective, Storrs, CT.*

In the last 50 years the world consumption of chicken eggs increased from 5 to 10 kilos. Chicken meat consumption rose from 2.5 kilos to 10 kilos. While most people have benefited from the overall increase in poultry consumption, the distribution of these products is far from uniform. Using information from the World Bank and the Food and Agriculture Organization of the United Nations, an estimate was made of average income (purchasing power parity) and consumption of chickens eggs and meat by income quintile. The estimates demonstrate a correlation between income and poultry consumption. The future consumption of poultry products will also be influenced by income distribution. This

kind of analysis can be useful for market studies either globally or within individual countries.

Purchasing power parity income quintile and chicken/egg per capita consumption in kg

Quintile	Yearly Income	Chicken	Egg	Total
1	\$26,000	22	18	40
2	\$7,000	15	14	29
3	\$4,000	9	9	18
4	\$2,000	3	6	9
5	\$1,000	1	3	4
Average	\$8,000	10	10	20

Key Words: Income Quintile, Egg Consumption, Chicken Consumption

873 Withdrawn by author. , .

Animal Behavior & Well Being III

874 Choice of attractive conditions by beef cattle in a Y-maze just after release from restraint. T. Ishiwata*¹, R. J. Kilgour², K. Uetake¹, Y. Eguchi¹, and T. Tanaka¹, ¹*School of Veterinary Medicine, Azabu University, Sagami-hara, Japan,* ²*Agricultural Research Centre, NSW Agriculture Trangie, NSW, Australia.*

To determine the attractiveness of different conditions to cattle, 189 Angus heifers were individually allowed to enter a choice area after 2 min of restraint in a crush to choose between 2 pens. After the animal had chosen a pen, she could freely access both test pens and the choice area for 5 min. In experiment 1, each heifer was given one of the following choices: pen with 3 familiar animals (Peers) vs. pen with a pile of hay on a metal rack (Food) (n=34); Peers vs. the bare pen (Bare) (n=34); Food vs. Bare (n=35). More heifers chose Peers over Bare ($\chi^2=5.76$; $P<0.05$). More heifers tended to choose Peers over Food ($\chi^2=2.94$; $P<0.10$), whereas Food and Bare did not differ. The latency to choose either pen was shorter ($P<0.01$), and they spent less time staying near the crush ($P<0.05$) if Peers was one of the two choices. After choosing, more heifers entered the Peers pen than the Food ($P<0.05$) and Bare ($P<0.01$) pen. Peers were the most attractive for heifers, and food was as least attractive as the bare condition was. In experiment 2, another 86 heifers were given one of the following choice: pen with a familiar handler standing inside (STI) vs. pen with a novel object (NO) (n=29); pen with the handler standing outside the pen (STO) vs. NO (n=29); pen in which the handler is sitting inside (SI) vs. NO (n=28). Fewer heifers chose the pen with the human ($\chi^2=9.97, 12.45$ and 7.00 for STI, STO and SI, respectively; all $P<0.01$). Except for the choice of STO vs. NO, the number of heifers that had voluntarily chosen either pen was larger than that of heifers that had not chosen 5 min after release (both $P<0.01$). The number of times in which the NO pen was entered was larger than the STI and STO (both $P<0.01$), although the numbers of times in which the SI and NO pens were entered was not different. Heifers avoided human, especially with them standing outside the fence. Heifers seem to recognize the sitting human as a kind of object.

Key Words: Beef Cattle, Behavior, Preference Test

875 Out-wintering pads (owp) for steers- animal wellbeing and production. M. C. Hickey*¹, A. P. Moloney², and P. French², ¹*Teagasc Beef Research Centre Grange, Dunsany, Co. Meath, Ireland,* ²*Teagasc Beef Research Centre, Dunsany, Co. Meath, Ireland.*

Indoor slatted floor accommodation raises fundamental concerns for animal wellbeing. The objectives of these 2 experiments were to evaluate the effect of accommodating steers, on OWP or indoors on slats a) with or without daily exercise, b) with access to an OWP or c) with modified slat surfaces, on animal wellbeing and production. In experiment 1, 54 steers were assigned to one of 3 treatments (i) slats at 3m²/hd, (ii) as with (i) but walked 4km/d or (iii) accommodated on an OWP. In experiment 2, 75 steers were assigned to one of 5 accommodation systems (i) slats at 2.5m²/hd, (ii) OWP at 18m²/hd, (iii) slats at 2.5m²/hd with access to an OWP, (iv) rubber matted slats at 2.5m²/hd or (v) straw bedding at 4m²/hd. Animals were offered grass silage ad-lib and 6kg grain daily in experiment 1 and a silage/grain mixture in experiment 2.

Diurnal lying and eating behavior, hoof health, cleanliness, feed intakes, liveweight and slaughter data was recorded. Both experiments were of 5-month duration after which all animals were slaughtered. There was no effect of treatment on the duration of time spent lying or eating on either study. In experiment 1 animals accommodated on slats were dirtier ($p<0.01$) than animals accommodated on OWP, and had a greater incidence of medial erosion ($p<0.05$) on the hind, and lateral and medial erosion on the front hoof. Animals on the OWP had higher ($p<0.05$) feed intake and carcass gain than animals on slats. The inclusion of daily exercise did not affect animal behavior, intake or carcass gain. In experiment 2, when given access to an OWP, animals chose to lie outside irrespective of weather conditions. Animals accommodated on slats were dirtier ($p<0.05$) and had lower carcass gain ($p<0.05$) and feed intake ($p<0.01$) than animals accommodated on or with access to OWP. The provision of straw bedding or rubber matted slat surfaces did not affect behavior, feed intake or carcass gain, relative to animals housed on slats. In conclusion, the performance and wellbeing of steers was enhanced when accommodated on OWP rather than slats with or without modified surfaces.

Key Words: Beef Production, Outwintering, Slatted Accommodation

876 Effect of feeding Ascophyllum Nodosum on thermoregulation, behavior, and dehydration of sheep subjected to 12-h of transport. G. S. Archer*, T. H. Friend, C. Iacono, P. Krawczel, and R. Johnson, *Texas A&M University, College Station, TX.*

In order to determine the effect of feeding the seaweed *A. Nodosum* on thermoregulation, behavior and dehydration, 44 lambs (26 kg \pm 4.3) were fed one of four levels of the seaweed for two wk prior to 12-h transport during hot weather. Sheep received seaweed at either 0, 0.5, 1.0, or 2.0% of dry matter intake per day. Each sheep swallowed four gelatin capsules twice a day filled with *A. Nodosum* or their normal ration, depending on the treatment. Prior to transport, temperature data loggers were secured in the ear of all sheep to measure changes in body temperature during transport. Blood samples were taken immediately before and after transport. When the 0% lambs body temperature peaked, the 2% lambs were significantly lower ($P = 0.03$), with the other treatments being intermediate. Variation in body temperature during the course of transport for the 0% lambs (1.3 C) was wider than the 2% lambs (0.9 C, $P = 0.055$). All sheep immediately went to feed post-transport. There was a trend ($P = 0.21$) for 2% lambs to have the shortest latency to drink (589 s) and for 0% lambs to have the longest (823 s). All sheep laid down at approximately the same time post-transport. The 0% lambs significantly increased in sodium (Na), chloride (Cl), and potassium (K) and the 0.5% lambs significantly increased in K concentrations post-transport compared to pre-transport concentrations. Changes in electrolyte concentrations for the other treatments were not different from pre-transport concentrations. Post-transport concentrations of Na and Cl were less ($P < 0.05$) in 1 and 2% lambs than in 0 and 0.5% lambs. The 0% lambs also had higher ($P < 0.05$) K concentrations post-transport than 1 and 2% lambs. Feeding *A. Nodosum* for two weeks prior to transport allowed the animals to better thermo regulate during

transport under hot conditions. Although animals who received higher amounts of A. Nodosum prior to transport tended to drink sooner after transport, they actually had lower electrolyte concentrations post transport, indicating they were better hydrated.

Key Words: Hydration, Thermoregulation, Transport

877 The effect of a naloxone implant on the oestrus behavior, the LH preovulatory surge and on the ovulation rate of the crossbred Mexican ewe during the breeding season. V. Fuentes* and P. Fuentes*, *Centro Universitario de los Altos, Universidad de Guadalajara, Tapatitlan, Jalisco, Mexico.*

With the objective of studying the effect of a naloxone implant on oestrus behavior in the ewe, two groups of 10 crossbred Mexican ewes were selected at random during the breeding season of 2002. One group was implanted with a pellet containing 10 mg of naloxone and the second group received an implant with no drug. The same day of implant all ewes were treated with intravaginal sponges impregnated with 40 mg Medroxi Progesterone Acetate, after 14 days, sponges were withdrawn and 2 ml blood samples were taken through a jugular catheter, at intervals of 20 minutes since 24 hours after the sponges were withdrawn, sampling continued until the beginning and until the end of oestrus. It was observed that in ewes treated with naloxone the Preovulatory LH surge was advanced in the order of 4 h as compared with controls ($p < 0.001$). Furthermore, the duration of oestrus in naloxone treated ewes was significantly longer from that of control ewes (40 ± 6 h vs 28 ± 3 , $p < 0.001$). Ovulation rate in treated animals was in the order of 2.3 ± 5 vs $1.5 \pm .4$ of control ewes ($p < 0.01$). It was concluded that naloxone treatment altered oestrus behavior and ovulation rate. Giving further support to endogenous opioids as modulators of sexual behavior in the ewe.

Key Words: Naloxone, Oestrus, LH

878 Utilization of an onboard watering system by slaughter horses during transport. C. M. Iacono*, T. H. Friend, R. Johnson, P. Krawczel, and G. Archer, *Texas A&M University, College Station.*

This study determined if slaughter horses would drink onboard a semi-trailer, how long water needed to be available, and if water consumption reduced weight loss. Data were from three shipments of slaughter horses originating from Amarillo, TX (16 h, $n=17$), Hutchinson, KS (23 h, $n=19$) and La Grande, OR (28 h, $n=14$). The 19.2 m long semi-trailer was divided into three compartments and ten video cameras were mounted in the trailer to quantify drinking behavior. Five to 10 horses of different breeds, ages, sexes and body condition were placed into each compartment. Horses in two compartments were given water (two 1-h watering sessions for the TX and KS trips, and three for OR) with the third non watered compartment serving as a control. Horses were weighed before and after transport. The mean temperatures inside the trailer for the trips were 30, 22 and 18° C for the TX, KS, and OR trips. For the TX trip, 88.2% of the horses drank at least once during the first watering session. All of the horses on the KS trip drank at least one time during the two watering sessions. For the OR trip, 85.7% of the horses drank at least once over the three watering sessions. For TX, the majority of horses drank within the first 20 min whereas for KS and OR, it was not until 50-60 min that the majority of horses drank. Horses that had access to water on the TX trip lost less weight ($P = 0.018$) than those that did not have access to water. During the cooler weather trips, a trend was evident for the watered horses in the KS ($P = 0.19$), but not OR ($P = 0.74$) trips, to lose less weight. Water consumption averaged 3.79 L/horse during TX, 1.85 L for KS, and 2.80 L for OR. The results from this study indicate slaughter horses will drink during transport if given the opportunity and are more likely to drink sooner when they are transported during hot weather. Watering during transport in hot weather will result in significantly less shrink.

Key Words: Horse, Transport, Drinking

879 Effect of continuous versus rested transport on blood chemistry, electrolytes and behavior of lambs. P. Krawczel* and T. Friend, *Department of Animal Science, Texas A&M University, College Station.*

A proposed set of European Union Regulations for the transportation of livestock requiring multiple rest periods was evaluated for its efficacy. Rambouillet crossbred lambs averaging 17.6 ± 0.5 kg were randomly assigned to one of three treatments: continuously transported for 22 h ($n = 15$); transported for 8 h, unloaded and rested for 6 h, transported for 8 h, unloaded and rested for 24 h, transported for 6 h ($n = 15$); or control which remained in the home pasture throughout the study ($n = 16$). Food and water were provided during rest, which was in novel pens to simulate actual transport. Jugular blood samples were collected from all sheep prior to transport, at the end of each transport or rest period and 24 h after the conclusion of transport. Feeding behavior during rest stops and after final unloading were also quantified. After 14 h, glucose ($P = 0.0001$) decreased while total serum protein ($P = 0.011$) and bilirubin ($P = 0.011$) increased for continuous relative to rested or control. At the conclusion of transport for continuous, glucose ($P = 0.0001$) and magnesium ($P = 0.005$) decreased while blood urea nitrogen ($P = 0.0001$), total serum protein ($P = 0.036$), bilirubin ($P = 0.0001$) and creatinine ($P = 0.01$) increased relative to rested or control. Electrolytes varied between all three treatments at 14 h and 22 h, but no distinct pattern was evident. Both transported treatments chose feed over water immediately following unloading. The latency between unloading and first bout of drinking for continuous (23.9 ± 1.4) and rested (17.7 ± 4.5) was not different. The food and water provided during rest periods prevented signs of food deprivation in the rested lambs, which occurred in the continuous lambs. Blood chemistry and behavioral data indicated access to food was the main benefit of the rest periods. Dehydration was not evident in the continuous lambs despite temperatures peaking at 41° C.

Key Words: Lamb, Transport, Behavior

880 The effect of long-chain polyunsaturated fatty acid and vitamin E supplementation of ewes on neonatal lamb vigour. J. L. Capper*, R. G. Wilkinson, S. E. Pattinson, A. M. Mackenzie, and L. A. Sinclair, *Harper Adams University College, Newport, Shropshire, United Kingdom.*

The long-chain polyunsaturated fatty acid (PUFA) docosahexaenoic acid (DHA) is vital for development of the foetal brain: studies in humans have shown positive effects of DHA supplementation upon infant cognitive development and visual acuity. As ruminant diets are low in DHA, a behavioural response to supplementation may be observed. Furthermore, supplementing pregnant ewes with high levels of vitamin E produces lambs that are more vigorous immediately after birth. This experiment investigated the effects of dietary long-chain PUFA and vitamin E supplementation of ewes on neonatal lamb vigour. Forty eight Lleyn and Mule ewes were allocated to one of four treatments at 103 days of gestation in a 2 x 2 factorial, randomised block design. Ewes were individually penned from six weeks *pre-partum* to four weeks *post partum* and fed one of four treatment concentrates, each containing either fish oil plus Incomega (a DHA source fed at a 25:75 ratio with fish oil) or Megalac as the main fat source and a basal (50mg/kg) or supra-nutritional (500mg/kg) concentration of vitamin E. At lambing, lambs were focal sampled and the latencies of standing and successful suckling were recorded. Birthweight data was recorded at +12 hours *post partum*. Gestation length was significantly increased in ewes fed fish/DHA (147.8 days v.s 145.6 days; s.e.d 0.51, $P < 0.001$) and lambs born to these ewes suckled on average, 9.4 minutes sooner than lambs from the Megalac treatment (34.0 minutes vs. 43.4 minutes; s.e.d 3.48, $P < 0.01$). Moreover, supra-nutritional vitamin E supplementation reduced the latency of standing in lambs from ewes fed fish/DHA (14.9 minutes vs. 23.6 minutes; s.e.d. 3.23, $P < 0.05$) when compared to those fed Megalac. Supplementation of pregnant ewes with supra-nutritional levels of vitamin E conferred a 0.31kg increase in lamb birthweight (4.17kg vs. 3.86kg; s.e.d 0.135, $P < 0.05$). Long-chain PUFA supplementation of ewes had beneficial effects on neonatal lamb vigour. Supra-nutritional vitamin E supplementation of ewes significantly increased lamb birthweight, however it did not directly affect lamb behaviour.

Key Words: Behaviour, Neonate, Fatty Acid