

POSTER PRESENTATIONS

Animal Behavior and Well-Being: Swine and Poultry

T1 Recognition of maternal amniotic fluid by pre-weaning piglets. J. Figueroa*, D. Solà-Oriol, R. Davín, J. F. Pérez, and X. Manteca, *Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain.*

Pigs have a very developed olfactory system that allows them to recognize cues from the environment within the first days after farrowing. Amniotic fluid is a cue that piglets use to recognize their own mother and guide them to this key resource post-natally. The aim of this study was to estimate if sucking piglets of different ages have the ability to discriminate between their own mother's amniotic fluids versus an alien one. Forty male/female pigs from 10 litters (4 piglets/litter) were used to test their attraction for 3 olfactory stimuli (triple-choice feeding test) using a Triple-U-Testing Arena (TUTA), located in an isolated room on d 4, 14 and 21 after farrowing. Olfactory tested cues included strips impregnated with their own maternal amniotic fluid (MAF), alien amniotic fluid (AAF) and water in the middle as a control. The position of MAF and AAF were rotated in each test. Piglets were tested in litter-pairs to avoid fear and distractive behaviors. Each test lasted 7 min, during which, the time spent by piglets in nasal contact with each strip was measured by direct observation. Data were analyzed using the GLM procedure of SAS. Latency time accounted to more than 6 min of the 7 min test. Older piglets became increasingly agitated, looking for alternative routes to escape and they also had more play and exploring behaviors at the TUTA. Piglets showed preferential responses toward MAF at d 4 (10.32 s/couple) and 14 (2.57 s/couple) as compared with AAF (4.75, $P < 0.01$ and 0.98, $P < 0.05$ s/couple) and water (0, $P < 0.01$ and 0.54, $P < 0.01$ s/couple). No differences were observed at d 21. These results show that piglets are able to discriminate between their mother's amniotic fluid and amniotic fluid from other sows during their first weeks of life. This attraction might keep piglets protected near to the sow and also teach them to follow cues of maternal pregnancy feeding. Attraction for amniotic fluid begins to disappear as piglet needs and motivation changes with age.

Key Words: amniotic fluid, piglets, preference

T2 The effect of colostrum supplementation on piglets' body temperature recovery and lactation performance. R. Muns*, J. L. Ruiz de la Torre, P. S. Agostini, X. Manteca, and J. Gasa, *SNiBA, Departament Ciència Animal i dels Aliments, Universitat Autònoma de Barcelona, Barcelona, Spain.*

The objective of this paper was to evaluate the effect of helping piglets' colostrum intake on lactation performance. Fifteen Danbred sows from a commercial farm were distributed to 3 treatment groups based on BW, parity and back fat thickness 4 d before farrowing. After farrowing piglets with less than 1.250 kg BW ($n = 56$) were treated (T1: no intervention, $n = 24$; T-2: administration of manually milked sow's colostrum (10 mL/animal), $n = 18$; T-3: single doses of a commercial product (Calostrene/ANIVET) fed on d 0, $n = 14$). All piglets ($n = 172$) were weighted on farrowing day (d 0), d 1 and d 21 of lactation; rectal temperature was measured at birth and d 1. Piglet mortality was also recorded. Data of treated piglets were analyzed using the GLM procedure of SAS with piglet being the experimental unit. Piglet's initial BW did

not differ statistically among groups (mean value of 1.028 g/piglet, $P = 0.9$). T2 piglets tended to show higher BW gain after 24h of birth than T1 piglets (78.7 vs. 44.9g \pm 62.63; $P = 0.08$). Piglets rectal temperature at 24h of life was higher for T2 and T3 compared with T1 (38.8 and 39.1 vs. 38.2°C \pm 0.73; $P < 0.05$). Compared with T1 (3.624g), treated piglets total weight gain from d 0 to d 21 were 8.5 and 14.9% numerically higher for T2 and T3, respectively ($P = 0.3$); meanwhile corresponding values for all piglets improved by 6.1% and 9.7% for T2 and T3, respectively, over a 4.158 g/piglet for T1 ($P = 0.3$). Although T-2 had the lowest numerical mortality (when considering all the piglets) during lactation compared with T-1 and T-3 (7.9 vs. 10.6 and 9.6%; $P = 0.9$) it did not differ statistically among groups. These results show the importance of guaranteeing the colostrum intake by small piglets during the first hours of life enhancing its body temperature recovery and tending to improve its weight gain during the first 24h of live.

Key Words: piglet, colostrum, body temperature

T3 Comparison of pig restraint and sampling methods on blood lactate concentration. B. Buzzard*¹, L. N. Edwards¹, R. D. Goodband¹, D. B. Anderson², T. E. Engle², and T. Grandin², ¹*Kansas State University, Manhattan*, ²*Colorado State University, Fort Collins.*

The objective of the study was to examine the effects of restraint and blood sampling method on blood lactate concentration (LAC) in pigs. Restraint methods were snaring or restraint with sorting boards. Blood was sampled from 120 pigs (58 barrows, 62 gilts) at approximately 165 d of age (126.1 \pm 2.9 kg) over 2 consecutive days. Each day, 30 pigs were sampled per method. All pigs were housed in one barn and pigs in adjacent pens were not sampled simultaneously. Snaring consisted of a trained handler snaring each pig while blood was collected via jugular venipuncture (approx. 7 mL). Restraint with sorting boards consisted of a trained handler restraining each pig with 2 sorting boards and the side of the pen to form a 3-sided barrier reducing pig movement. The distal ear vein was pricked with a 20-gauge needle to obtain several drops of blood for LAC analysis. LAC was measured using a hand-held lactate analyzer. The duration of restraint and a behavior score (1-4, 1 = no vocalization or movement and 4 = constant movement, vocalization and struggle) for each pig were recorded during sampling. LAC was compared between the 2 sampling methods and duration of restraint was used as a covariate in the analysis. Results indicated that pigs that were snared had greater ($P = 0.04$) LAC than pigs that were restrained using the sorting board method, 2.4 \pm 0.1 and 2.1 \pm 0.1 mM respectively. Both measurements of LAC were considerably lower than baseline LAC reported in published literature. There was a positive correlation ($r = 0.42$, $P = 0.001$) between duration and LAC for pigs that were restrained by snaring; the longer the restraint duration, the greater the LAC. Positive correlations were observed between duration and behavior score ($r = 0.41$, $P = 0.001$), duration and LAC ($r = 0.64$, $P < 0.001$) and behavior score and LAC ($r = 0.26$, $P = 0.05$) in pigs restrained with sorting boards. In the boarded group, longer durations and higher behavior scores were related to increased LAC. Restraint duration should be kept at a minimum when both methods are used.

The sorting board sampling method is a potential technique to use when sampling small quantities of blood in pigs.

Key Words: lactate, restraint, pig

T4 The effect of alleyway width on gestating sow welfare in a free-access stall system. L. A. Mack*¹, M. F. Elischer¹, S. D. Eicher², A. K. Johnson³, D. C. Lay, Jr.², B. T. Richert¹, and E. A. Pajor⁴, ¹*Purdue University, West Lafayette, IN*, ²*LBRU, USDA-ARS, West Lafayette, IN*, ³*Iowa State University, Ames*, ⁴*University of Calgary, Calgary, AB, Canada*.

Free-access stalls allow sows to choose the protection of a stall or use of a shared alleyway. This study investigated the effect of alleyway width on production and physiological variables in gestating sows. At ~33 d of gestation, 21 sows (n = 168) were equally assigned to 1 of 3 pens that had 7 free-access stalls. Each pen had a shared alleyway of 0.91, 2.13, or 3.05 m wide. Sows were moved to farrowing ~5 d before expected farrowing date. Back fat (BF), BW, BCS, and lameness (LM) were measured on d 35, 65, and 101. Sows' body lesions were scored weekly. Blood samples were collected on d 30, 66, and 100. Data were analyzed in SAS using a mixed model with a post-hoc Tukey adjustment. Although similar basally, overall BF was greater in 0.91 m sows than 2.13 m sows ($P < 0.05$) and increased in all groups over time ($P < 0.05$). Sow BW increased over time ($P < 0.0001$) but did not differ by treatment. BCS showed no overall treatment or time differences, but on d 35 0.91 m sows had a higher BCS than 3.05 m sows ($P < 0.05$). Lameness increased slightly in 2.13 and 3.05 m sows immediately after mixing and decreased afterward in 3.05 m sows ($P < 0.05$). Upper body lesions increased immediately after mixing and then decreased in all treatments ($P < 0.0001$). Lower body lesions showed no differences by treatment or time. Cortisol increased after mixing and then decreased ($P < 0.01$), but no treatment differences were observed. Neutrophil percentage was greater ($P < 0.05$) and the neutrophil: lymphocyte ratio tended to be greater ($P < 0.08$) in 0.91 m sows than the 3.05 m sows. No other leukocyte populations differed by time or treatment. Overall, the 3 alleyway widths were similar, but 0.91 m sows had greater back fat implying decreased activity and musculation due to space restrictions. The sows in 0.91 m alleyway also showed increased neutrophil percentage suggesting a slightly greater stress level.

Key Words: sow housing, welfare, stress

T5 A comparison of two farrowing environments on piglet performance. A. R. Hanson*, P. M. Walker, and J. P. Holt, *Illinois State University, Normal*.

Traditional farrowing stalls have been designed to maximize piglet survival, with minimal concern regarding sow welfare. Standard litter data (birth weight, number born alive, etc.) from farm records were evaluated in an observation study utilizing a 200 sow (Chester White cross and Landrace cross) operation over a 6 y period (1449 litters) to compare 2 stall types, free stalls with movable sides (F), or traditional, fixed bow-bar stalls (B), on piglet performance and welfare. The F stalls were closed (in a straight position) ~1d before expected date of parturition and opened up to a triangular shape at ~3d post farrowing giving sows the ability to turnaround. Sows were placed into stalls 3–7 d before their expected date of parturition (n = 740 for B and 709 for F) and fed the same diet. Data were statistically analyzed, assuming a completely randomized design, using SPSS ANOVA procedures with year, season and room used as covariates and stall type as the independent variable. Sow parity was known for a limited number of litters (351), so a separate test was conducted using year, season, room, and parity

group (PG) as covariates. When data were analyzed with PG excluded, there were differences favoring the B stall for birth performance and weaning performance ($P < 0.05$). Adjusted weaning weight was greater ($P < 0.05$) in B stalls compared with F stalls (mean = 61.22 ± 10.8 kg and 57.429 ± 11.56 kg, respectively). Number of pigs crushed was not impacted by any independent variable in this study (mean = 1.03 ± 1.24 and 1.01 ± 1.48 pigs/litter for B and F stalls, respectively). Data analysis suggested that larger sows may have been allotted to B stalls due to the difficulty for them to turnaround in F stalls successfully. Therefore, PG was included as a covariate to account for sow size, assuming that larger sows were multiple parity sows. Consequently, differences between the stalls became nonsignificant ($P > 0.05$). These results indicate that success in farrowing stalls may be affected by an interaction between sow size and stall design. Stalls which offer increased sow movement can be used without negative effects on piglet performance.

Key Words: farrowing stall, sow housing

T6 Behavior of Duroc pigs on sudangrass (*Sorghum bicolor*) pastures. S. Pietrosemoli*^{1,2}, J. C. Guevara², A. Lobo³, J. Cardona³, W. Maradiaga³, and J. T. Green^{4,2}, ¹*Animal Science Department, North Carolina State University, Raleigh*, ²*Alternative Swine Research and Extension Project, Raleigh, NC*, ³*Universidad Nacional de Agricultura, Catacamas, Olancho, Honduras*, ⁴*Crop Science Department, North Carolina State University, Raleigh*.

To evaluate the effect of weekly movement of shade and drinking structures on pig behavior, 72 Duroc pigs (castrated males and females; 32 and 97 kg initial and final live weight, respectively) were used during 5 weeks (July - August 2009) at the Center for Environmental Farming System (CEFS) in Goldsboro, NC. Twelve pigs were randomized to each of 6 sudangrass 0.16 ha paddocks ($135 \text{ m}^2/\text{pig}$), and were managed under 2 different strategies: Stationary (S) or Mobile (M) shade and drinking structures, in M shade and drinkers were moved on a weekly basis. Animals were kept under a continuous grazing system, with ad libitum access to a concentrated feed (16% PC) and water. Pig behavior was registered by one trained observer through direct observation (12 min/paddock) of the activity of the animals from outside the paddock twice a week, 5 times/day: 8:00 and 10:00 a.m. and 12:00, 2:00 and 4:00 p.m. Animals activities were categorized as eating, drinking, lying/resting, walking, grazing and rooting, and were expressed as percent. The experimental design was a completely randomized block, with 3 field replicates. Data was square root (x+1) transformed before performing ANOVA through PROC GLM of SAS v9.1. Pigs spent most of their time lying/resting ($65.8 \pm 2.1\%$), eating $8.64 \pm 0.9\%$, drinking $3.02 \pm 0.4\%$, walking $14.69 \pm 1.5\%$ grazing $5.49 \pm 0.9\%$ and rooting $2.4 \pm 0.4\%$). Shade and drinkers movement strategies did not show an effect in any of the animal activities. The time of the day influenced animal behavior ($P < 0.05$), pigs being more active in the morning, as can be observed from lying/resting pattern 8:00 a.m.: 39.5%; 10:00 a.m.: 47.1%; 12:00 p.m.: 86.9%; 2:00 p.m.: 87.3% and 4:00 p.m.: 68.2%. In conclusion, these results suggest that pigs are more active during the cooler time of the day and that movement of shade and drinking structures had no effect on pig behavior.

Key Words: outdoor pigs, behavior, sudangrass

T7 Effects of postnatal serotonin agonism on fear response and memory. R. L. Dennis* and H. W. Cheng, *Livestock Behavior Research Unit, USDA-ARS, West Lafayette, IN*.

The neurotransmitter serotonin (5-HT) acts as a neurogenic compound in the developing brain. Early administration of a 5-HT agonist alters

the development of serotonergic circuitry, altering behaviors mediated by 5-HT signaling, such as memory, fear and aggression. The present study was designed to investigate the effects of early 5-HT agonism on later behaviors. White leghorn chicks were given an injection of 5-MT (5-HT agonist) at 2.5mg/kg (low dose), 10mg/kg (high dose) or saline (control) on day of hatch and a second dose 24 h later. Chicks (n = 13/treatment) were tested for fear response and memory at 2 wks of age. Chicks were subjected to a social isolation fear test for 20 min, time to first vocalization, number of vocalizations, time to first leap and number of leaps were recorded. ANOVA using SAS proc mixed revealed that chicks injected with low dose of 5-HT agonist had significantly shorter latency to time of first vocalization and a greater number of vocalizations compared with control birds ($P < 0.05$). Chicks treated with the high dose of 5-HT agonist tended to exhibit the same pattern of behavioral change ($P < 0.10$). No difference was found in latency to or frequency of leaps. In a memory test, chicks were placed in a running wheel and presented with an imprinted object (white box with a red light) and a novel object (blue box with a white light). The distance traveled in the wheel toward each object was measured. Analysis of variance results revealed that chicks from all groups traveled a similar distance toward a familiar object. However, control chicks walked the least toward a novel object, low dose chicks tended to walk further toward a novel object ($P < 0.10$), and high dose chicks walked significantly farther for a novel object ($P < 0.05$). No difference was found between treatments in a tonic immobility fear test ($P > 0.05$). Body weight and fluctuating asymmetry of the shank, and shank absolute length and width did not differ among treatments ($P > 0.05$). Our data show that later behaviors including fear and memory can be altered by early alteration of the 5-HT system without altering growth development, such as body weight, leg size and bilateral symmetry.

Key Words: serotonin, postnatal, behavior

T8 Influence of increasing-dim and bright, and split-dark-bright lighting on broiler mobility and stress. R. J. Lien*, J. B. Hess, and S. F. Bilgili, *Auburn University, Auburn, AL.*

The objectives were to determine lighting and strain effects on mobility and stress responses for tray pack (TP) and breast yield (BY) broilers exposed to programs meeting either US or EU lighting guidelines. Forty males were placed by strain in each of 2 1.5 by 3.7 m pens in 12 light controlled rooms. An increasing-dim (ID) treatment (23L:1D, 1–7 d; 12L:12D, 8–14 d; 14L:10d, 15–21 d; 17L:7D, 22–28 d; 20L:4D; 29–35 d; 23L:1D; 36–48 d; 2 FC to 7 d and 0.25 thereafter) was provided in 4 rooms. An increasing-bright (IB) treatment (23L:1D, 1–7 d; 12L:12D, 8–14 d; 14L:10D, 15–21 d; 16L:8D, 22–28 d; 18L:6D, 29–45 d; 23L:1D, 46–48 d; 2 FC throughout) was provided in 4 rooms. A split-dark-bright (SDB) treatment (16L:4D:2L:2D and 2 FC) was provided in 4 rooms. Sitting or standing on 15 cm high raised platforms (decking), the ability to climb onto raised platforms to feed, tonic immobility (TI), and heterophil:lymphocyte ratios (H:L) were determined at approximately 3 and 6 wk. Gait scores and latency to lie durations were determined during wk 7. Data were analyzed by GLM of SAS with a statistical significance level of $P < 0.1$. At 3 wk, decking was greatest in IB treatment (11.0%), least in SDB (6.7%), and intermediate in ID (8.7%) ($P = 0.03$). Decking was greater in the TP (11.5%) than BY (6.7%) strain at 6 wk ($P = 0.001$). Feeding on raised platforms was greater in the TP (1.67) than BY strain (1.34) at 3 wk ($P = 0.004$). TI was greater in the ID (267 s) and IB (283 s) than the SDB treatment (201 s) at 6 wk ($P = 0.09$), and nearly greater in the TP (194 s) than BY (128 s) strain at 3 wk ($P = 0.13$). At 3 wk, H:L was greatest in the IB treatment (0.52), least in SDB (0.40), and intermediate in ID (0.43) ($P = 0.06$). Gait scores and latency

to lie durations were not affected ($P > 0.1$) by treatment or strain. In this study, lighting treatments and broiler strains inconsistently affected measures of mobility and physiological or psychological stress.

Key Words: broiler, lighting, stress

T9 The use of lidocaine as an analgesic to study immediate pain associated with hot blade beak trimming in 1- and 10-day old White Leghorn chicks. M. Cho*, K. Schwean-Lardner¹, A. Livingston², and H. L. Classen¹, ¹*Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada,* ²*Department of Veterinary Biomedical Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.*

Hot blade (HB) beak trimming (BT) is commonly used by the poultry industry to reduce feather pecking and cannibalism. As there is a poor understanding of pain immediately post HB trimming, research was conducted using lidocaine as an analgesic and behavioral observation as an indicator of a pain response to BT. An initial study used behavioral observation and the known analgesic effects of lidocaine to select 0.4 mL of 0.02% lidocaine with epinephrine (LE) as an effective dose for 1-d old chicks. Based on 1-d old chick results and body weight, 0.4 mL of 0.04% LE was set as a suitable dose for 10-d old chicks. Trials with 1- and 10-d old chicks compared the effect of LE with BT (removal of 1/3 of beak), saline with BT, BT with needle insertion, no BT with needle insertion and LE without BT on bird behavior for 135 min post HB trimming. Leghorn chicks (40 1-d, 30 10-d) were assigned to treatment groups and 1 chick per treatment was assigned to each of 8 and 6 replications, respectively. Behavior was analyzed using the SAS GLM procedure and a priori contrasts to evaluate the effects of liquid injection, LE injection and BT on chick behavior (% of time; $P \leq 0.10$). Less walking behavior was seen in 1- (2.2 vs. 3.8%) and 10- (2.1 vs. 3.6%) d old chicks with liquid injection. LE injection to BT chicks did not affect behavior in contrast to those trimmed with either saline injection or needle insertion indicating that pain is not associated with the period immediately post treatment in 1- and 10-d old chicks. However, BT decreased standing (16 vs. 21%) and feed pecking (6.3 vs. 9.4%) and increased resting (66 vs. 59%) behavior in 10-d old chicks in comparison to untrimmed chicks suggesting that physical trauma other than pain impacts chick behavior. In conclusion, these results suggest a painless phase post HB trimming at 1- and 10-d of age but that trimming continues to affect behavior in comparison to untrimmed birds.

Key Words: poultry welfare, pain, feather pecking

T10 Comparison of an enriched and barren environment on welfare related fear behaviors of commercial laying hens. C. J. Davis*, H. Taira, M. M. Beck, and P. A. Skewes, *Clemson University, Clemson, SC.*

In response to the debate over laying hen welfare, this study was conducted to determine the effects of housing environment on 2 welfare related fear behaviors of commercial laying hens. Emergence test [EM] and tonic immobility test [TI] were used to determine the fearfulness of the laying hens. Nine hundred day-old Leghorn chicks were randomly assigned to either a floor pen environment or a commercial cage housing environment. The cage chicks were housed in 20 commercial battery brooder cages (25 per cage) up until 4 weeks of age and then moved to 39 battery grower cages (10 per cage). At 16 weeks of age, the pullets were moved into 39 commercial layer cages (8 per cage) for the remainder of the experiment. The floor pen birds were continuously housed in 14 individual floor pens (28 per pen) enriched with perches, dust baths, and nest boxes. Behavioral assessments were conducted at wk 17, 21, 25, 29

and 33. Both behavioral assessments were conducted on 10 hens from the cage environment and 10 hens from the pen environment. Cages and pens were selected randomly. The latency to emerge from a box was recorded in the EM and the latency to recover from tonic immobility was recorded during TI. Comparison of environmental treatments with a 2 sample *t*-test showed a shorter mean EM and TI duration in birds housed in the enriched environment ($P < 0.001$). The mean emergence duration for cage birds was 320.6 ± 30.0 s compared with 155.9 ± 30.0 s for floor pen birds. The mean tonic immobility duration for cage birds was 384.3 ± 35.8 compared with 212.2 ± 35.1 for pen birds. In addition to the overall treatment difference, there were significant differences at specific sample times. Although previously it was found that the effect of rearing environment was not consistent with fear responses for chicks and pullets, it appears that the housing environment had a consistent effect on fear response for the adult laying hens. In this study, hens from the enriched environment showed less fear than those from the barren environment.

Key Words: tonic immobility, emergence test, laying hen welfare

T11 The behavior of Japanese quail fed diets supplemented with passionflower. J. D. T. Silva, F. H. Hada, R. H. Marques, R. A. Gravena, V. K. Silva, S. A. Queiroz, and V. M. B. Moraes*, *São Paulo State University, Jaboticabal, SP, Brazil.*

This study evaluated the effect of passionflower (*Passiflora alata*), phytotherapeutic properties with anxiolytic and sedative, on the diet on the behavior of Japanese quail in the reproductive phase. Twenty-four female and 8 male 35-d-old birds were mated in a completely randomized design consisting of 2 treatments (0 and 500 mg passionflower/kg feed) with 4 replicates of 4 birds (3 female:1 male) for 120 d. During the observation period, a 4 camera CCTV surveillance system was mounted in the roof of the facility, that recorded the behavior of quails. The behavioral parameters (eating, drinking, feather preening, comfort movement, avoid and escape, aggressiveness, crouching) were tabulated over 5-h time spans made every 14 d, for a total of 6 observation periods for each cage. The assessment of focal bird behavior was accomplished by marking the birds with non-toxic paint. The inclusion of passionflower in the diet of the breeding quail increased consumatory behaviors of birds in time spent by eating (from 25.92 to 27.19%), drinking (from 13.45 to 17.26%), feather preening (from 9.10 to 14.95%), comfort movement (from 13.02 to 17.08%) and crouching (from 7.35 to 14.46%) ($P < 0.0001$). Expressions of avoid and escape (from 14.08 to 6.20%) and aggression (from 17.07 to 2.85%) were reduced ($P < 0.0001$). It was concluded that passionflower enhances the positive expression of behaviors related to the welfare of Japanese quail during breeding.

Table 1. Average percent time spent by birds on behaviors as affected by diets supplemented with and without passionflower

Passionflower (mg)	Eating		Drinking		Feather preening		Comfort movement		Avoid and escape		Aggressiveness		Crouching	
0	25.92 ^b	13.45 ^b	9.10 ^b	13.02 ^b	14.08 ^a	17.07 ^a	7.35 ^b							
500	27.19 ^a	17.26 ^a	14.95 ^a	17.08 ^a	6.20 ^b	2.85 ^b	14.46 ^a							
P	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001							
CV (%)	1.88	4.01	6.47	1.24	7.26	5.38	15.25							

Means followed by same letter in column do not differ by Fisher's test ($P \leq 0.05$).

Key Words: behavior, *Coturnix coturnix japonica*, welfare

T12 Strain differences among six varieties of fowl in two fear tests. G. S. Archer* and J. A. Mench, *University of California, Davis.*

Fear tests are often used to assess the well-being of chickens. It is important to examine how genetics may affect behavioral responses during fear testing. We conducted 2 fear tests to examine the responses to induction of tonic immobility (TI) test and inversion after catching (INV), on 6 different varieties of fowl: red Junglefowl (JF, $n = 17$), red Junglefowl/Rhode Island Red crosses (JFC, $n = 20$); 3 different single-comb White Leghorn (SCWL) varieties (HyLine CV20, $n = 20$, a commercial egg layer; UCD-03, $n = 20$, an inbred line of MHC recombinants; Mono-PNU, $n = 20$, which lacks the MHC II receptor), and featherless chickens (FL, $n = 20$, derived from multiple crosses). Data were analyzed using GLM or Kruskal-Wallis. JF and FC required more inductions ($P < 0.05$) than CV20 and Mono-PNU during TI. The UCD-03 also required more ($P < 0.05$) inductions than Mono-PNU. Latency to first head movement during TI was longer ($P < 0.05$) in CV20 (54.3 s) than in all other varieties (15.8 s). Latency to right was longer ($P < 0.05$) in CV20 (301 s) and Mono-PNU (517 s) than JF (112 s) and FL (225 s) varieties. UCD-03 had a shorter ($P < 0.05$) duration of wing flapping (3.9 s) and fewer total flaps (15.9) than all other varieties during INV (9.4 s, 55.2 flaps). UCD-03 (3 flaps/sec) and Mono-PNU (3.6 flaps/sec) wing flapped less intensely ($P < 0.05$) than all other varieties (5.9 flaps/sec) except JFC (5.2 flaps/sec), while FL flapped (6.8 flaps/sec) more intensely ($P < 0.05$) than all varieties except JF. Factor analysis revealed that there were 2 factor loadings for each variety but that the variables measured loaded differently for each variety. These results demonstrate that different varieties of fowl react differently during different fear tests and different types of fear responses predominate in different varieties.

Key Words: fear, chicken, genetics

T13 Behavior expression of testosterone treated cockerels in response to social grouping. S. S. Askari Rankouhi*, M. A. Karimi Torshizi, R. Vaez Torshizi, A. Niknam, and A. Maghsoudi, *Tarbiat Modares University, Tehran, Iran.*

For many years it is demonstrated that testosterone hormone increase sex secondary characters and also, enhance aggressive behavior of animals. The objectives of this study were evaluation of sex secondary character expression in testosterone injected birds as affected by un-injected pen-mates' behavior. Total of 60 1-d-old male broilers (Arian - Iranian Hybrid) were divided into two identical groups (30 birds per group). Chicks of the first group received 25 mg of testosterone enanthate by intramuscular injection. Birds of the second group were injected by sterile physiological serum and were considered as control group. A week post injection, a third experimental group was formed by mixing 10 birds from each of the two initial groups, therefore the three final experimental groups were un-injected control, testosterone injected and blend of injected and un-injected birds. The length of neck feathers, size of comb (mm) and attack toward wood stick or hand (number of attacks per minute) were evaluated at days 21 and 42 of age. The testosterone injection caused significant differences in all measured variables compared to control un-injected birds at 21 days of age ($P < 0.05$). Interestingly, at 42 days of age the effects of testosterone on measured variables were influenced by the composition of pen-mate individuals. The testosterone induced changes on above mentioned sex secondary characters were rapidly restored in those injected birds which had un-injected pen-mates, while testosterone induced sex secondary

characters stayed unchanged in all-injected birds group ($P < 0.05$). The results of the present study showed the impact of social behavior of pen-mates on the expression of physiological and behavioral changes induced by testosterone injection in cockerels.

Key Words: testosterone, cockerels, social behavior