Behavior and Well-Being

227 A survey of ostrich producers, handlers and processors for developing indicators to assess welfare related management and processing practices in ostrich production. M. Bejaei* and K. M. Cheng, University of British Columbia, Vancouver, Canada.

Welfare of an animal is a complex qualitative issue. Various stakeholders (policy makers, welfare experts and farmers) have different opinions/understanding regarding the welfare of an animal and the lack of agreement can cause inappropriate actions. Ostrich production is a relatively young industry in North America and their welfare issues are not much studied. Appropriate management of an ostrich’s exposure to stressors during production, shipment and processing will improve its well-being and its product quality. The objective of our research is to develop indicators to assess welfare related management and processing practices. We hope that translating a qualitative issue into a quantifiable issue will improve ostrich well-being and the quality of its products. The first step is to identify existing ostrich production norms using a producers/handlers/processors’ survey. Indicators will be developed based on the information obtained from this survey, farm visits, expert interviews, literature review and review of Codes of Practices. For this survey, a questionnaire was designed. The questionnaire had 4 sections: 9 general questions, 37 production questions, 25 shipping questions and 20 processing questions. We used mail and internet survey methods to gather data from ostrich producers, handlers and processors in the US and Canada. There were high variations in net income resulted from various ostrich farming products. Producers considered the unique quality of ostrich products, higher consumer demand than supply, and high efficiency of ostrich farming as the strengths of the industry. However, lacking a strong association, lacking research/government support and lacking proper processing facilities were identified as the weaknesses. Influences of multiple factors will be considered in developing welfare indicators such as size and density of rearing and holding pens, access to feed/water, tagging, bedding material, feed/water withdrawal, capturing, producers’ behavior, loading, trailer/transportation condition, unloading, lairage and processing methods.

Key Words: ostrich, welfare, producer, processor, survey

228 Effects of transport and nutrient supplementation on hematology, blood biochemistry and live weight loss in adult ostriches. M. Bejaei*1, D. C. Bennett1, A. Schaefer1, and K. M. Cheng1, 1University of British Columbia, Vancouver, Canada, 2Agriculture and Agri-Food Canada, Lacombe, Alberta, Canada.

In Canada, there are very few abattoirs that process ostriches and farmers have to ship their birds over long distance for processing. Ostrich is a large bi-pedal bird, and maintaining its balance inside a trailer during transport is stressful and energy demanding, and may result in shrinkage, injuries and lower meat quality. In this study we were assessing the influence of transport and pre-transport nutrient supplements on hematology, blood biochemistry and live weight loss in ostriches. Ostriches (2.5 to 3 yrs old; 12 males and 12 females) were shipped from a farm in Alberta to another farm in British Columbia in a modified horse trailer (18 h of driving). Birds were weighed and blood sampled (10 mL) before and after shipment. Prior to shipping, each bird in the treatment group was tube-fed 1 L of liquid nutrient supplement (water, dextrose and electrolytes). Birds in the control group were each tube-fed 1 L of water. Data were analyzed to assess the effects of sex, nutrient supplement and sample collection time on shrinkage. Results show that females (90 ± 1.8 kg) were heavier than males (83.1 ± 3.2 kg). In all birds, plasma glucose, sodium, chloride, bicarbonate, uric acid, creatine kinase, alanine transaminase, aspartate aminotransferase levels, WBC counts, percent heterophils and H/L ratios were significantly higher after shipment. Birds lost more than 10% of their live weight during the shipment and % weight loss was correlated with length of transportation time. After standardizing for pre-shipment body weight, male controls lost greater % live weight than female controls. Nutrient supplemented birds had lower plasma anion gap level than the control group. We conclude that under the present shipping conditions, long distance transportation is detrimental to ostrich welfare with significant loss to farmers due to injuries and shrinkage.

Key Words: ostrich, transport, nutrient supplement, hematology, blood biochemistry

229 Differential expression of egg white proteins from laying hens treated with corticosterone. J. M. Kim*1,2, H. S. Yoon1,2, Y. H. Choi1,3, 1Division of Applied Life Sciences (BK21 program), 2Department of Animal Science, 3Institute of Agriculture and Life Sciences, Gyeongsang National University, Jinju, Republic of Korea.

The objective of this study was to investigate the effects of corticosterone (CORT) on the expression of egg white proteins in laying hens. Twenty, 47 week-old Single Comb Hy-Line Brown Leghorn laying hens were housed in individual cages in an environment-controlled room, and were provided with feed and water ad libitum. After a 2 week of adaptation hens were divided into 2 groups fed either control or CORT-containing experimental diet at 30mg/kg. Feed intake and egg production were monitored daily and body weight measured weekly. Egg weight and production were also measured. CORT treatment resulted in an increase in feed intake and body weight but a decrease in egg production. Two-dimensional electrophoresis, performed using egg white obtained at d 5, enabled the separation of 30 protein spots that were up- or down-expressed at least 1.2 fold compared with control. Intensity of spots of 3 gel images each treatment was processed by an image master and statistically analyzed by a t-test. Seven protein spots in CORT-treated group were significantly up- or down-expressed (P ≤ 0.05) and 9 spots had to tendency to be significantly expressed. The results of the present study provide evidence showing that proteins in egg white are differentially expressed in response to environmental stress, and have implications for the behavior and well-being of chicks derived from hens exposed to environmental stressors (Supported by an NGB21 grant PJ0080492011).

Key Words: laying hens, egg white proteins, stress, corticosterone, two-dimensional gel electrophoresis

230 Effects of distance and barriers between feeders and waterers on productive performance, carcass yield, and bone strength of broiler chickens. J. Arroyo-Villegas*1,2, J. Bautista-Ortega1, A. Cortes-Cuevas1, A. Pro-Martinez2, and C. A. Ruiz-Feria1, 1Texas A&M University, College Station, 2Colegio de Postgraduados, Montecillos, Mexico State, Mexico, 3Universidad Nacional Autonoma de Mexico, Mexico DF, Mexico.

Walking ability and bone health are important in broiler production. An experiment was conducted to evaluate the effects of distance (D, 3 m or
8 m), and the presence or no presence of ramps (R; 31 cm in height, 174 cm long) between feeders and waterers on productive performance, tibial breaking strength, and carcass yield. One d-old chicks (Cobb 500) were assigned to one of 4 treatments (2 × 2 factorial, 3m, 3mR, 8m, 8mR) with 4 replications (54 birds each). Chicks were brooded conventionally and raised on identical floor pens, with free access to feed (NRC, 1994) and water. Body weight and feed intake was recorded weekly. At d 28 and 49, 12 birds per treatment were killed, and tibias collected to measure breaking strength. At d 49, carcass yield and parts were also measured. Interaction effects were not significant. The BW was not affected by D, but birds without R were heavier than birds with R at d 28 and 49. However, feed conversion at d 49 was not different among treatments. Distance did not affect carcass yield (CY), but birds with R had higher CY than birds with no R. Neither drumsticks nor wings were affected by treatment, but birds in the 8m group had higher thigh yield than birds in the 3m group. There was an interaction effect for breast yield; birds in the 3mR group had the lowest breast yield, with no differences among birds in the other groups. Tibia breaking strength was not affected by treatment at any sampling time. Other parameters related to walking ability and well being remain to be investigated.

**Key Words:** bone breaking strength, broilers, carcass yield

### 231 The effects of light intensity on the welfare and performance of broilers

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In commercial production, low light intensities (<5 lx) are typically used for growing broilers. The EU regulations and several animal welfare certification programs require that birds be provided with a minimum of 20 lx of light, although there is little research evaluating this recommendation. Broilers (n = 250) raised under either 5 (Control) or 20 (Test) lux of light on 2 commercial farms were evaluated at 45d of growth for gait score (GS), pododermatitis (PD), hock lesions (HL), and feather cleanliness (FC). Eyes, hearts, and spleens were removed and weighed from 60 birds per treatment, and a blood sample taken to determine heterophil/lymphocyte ratios (H:L). Birds were tested for fearfulness using the human approach (HA) and inversion (INV) tests. Treatments did not differ in GS, PD, HL, or FC. Control had greater back-to-front ($F = 29.7, P < 0.001$), side-to-side ($F = 12.0, P < 0.001$), and corneal radii ($F = 18.7, P < 0.001$) eye dimensions than Test. There was no difference in spleen weights, although on one farm Test had heavier hearts than Control ($F = 8.3, P = 0.005$). H:L were higher in Test than Control on both farms ($F = 11.6, P = 0.001$ and $F = 5.3, P = 0.02$), but were within normal range (Control: 0.22 and 0.30; Test: 0.34 and 0.48). Test birds were more fearful than Control during both HA and INV ($F = 10.8, P = 0.001$ and $F = 18.7, P < 0.001$, respectively). Performance characteristics from more than 2.4mil birds processed over multiple flock cycles from 3 farms using these lighting programs were also evaluated. There were no differences in final BW, BW gain, feed conversion or liveability. However, Test had more ($F = 4.37, P = 0.04$) cellulitis (2.7%) and also tended to have more ($F = 3.26, P = 0.07$) whole body condemnations (0.27%) than Control (2.1 and 0.21% respectively). Feed costs were 1.3% higher, and total variable costs 1.2% higher, for Test. These results indicate that providing 5 rather than 20 lx of light did not have negative effects on the parameters measured, except that it was associated with enlarged eyes. Dimmer lighting, however, decreased fear responses to humans and improved several aspects of performance.

**Key Words:** broiler, health, fear, lighting, stress