The purpose of this study was to evaluate the effects of two dietary feed enzymes (Hostazym X (HZX) and Avizyme 1505 (AZ1)) on the performance of broiler chickens. Supplementing the diet with either enzyme showed significant effects on growth and feed efficiency. Quadratic equations were fitted through the response points for 49 broilers: Body weights and feed intakes for the broilers were: Control, 6.310, 11.863; NC, 6.662, 11.905; NC +HZX, 6.486, 11.824; NC+AZ1, 6.217, 11.383, respectively. Target live weights were compared at 4, 6 and 8 lb., chicken prices (GA Dock) at $0.68 and $1.00/lb. and feed costs at $200 and $400/ton. The value of feed savings by decreasing the diet by 30 kcal/lb ranged from $11.91/ton for 4.0 lb broilers fed $200 feed, to $29.59/ton for 8.0 pound broilers fed $400 feed. The value of extra meat by increasing the diet by 30 kcal/lb ranged from $37.71/ton for 6.0 lb broilers selling for $0.68/lb, to $57.91/ton for 8.0 pound broilers selling for $1.00/lb. The value of feed savings by adding HZX ranged from $7.02/ton for 4.0 lb broilers fed $200 feed, to $17.64/ton for 8.0 pound broilers fed $400 feed. The value of extra meat by adding AZ1 ranged from $3.94/ton for 4.0 lb broilers fed $200 feed, to $9.96/ton for 8.0 pound broilers fed $400 feed. The value of extra meat from AZ1 ranged from $11.99/ton for 6.0 lb broilers selling for $0.68/lb, to $18.51/ton for 8.0 pound broilers selling for $1.00/lb. The value of the extra salable meat from feeding enzymes is 2 to 3 times greater than feed savings (excluding costs for chicks and housing, etc). Enzyme value is directly dependent on the costs of feed and value of broiler meat, and indirectly dependent on reduced environmental costs for feed production and reduced unutilized nutrients (pollution) per pound of meat (not included in this analysis).

Key Words: Cobb, Broilers, Feed Enzymes, Performance, Economics

M71 A comparison of pine shavings vs. chopped willow as bedding for rearing broiler chickens. Paul Patterson*, Mike Hulet*, Terri Cranen*, Mike Hile, Eileen Wheeler* 1Department of Poultry Science, The Pennsylvania State University, University Park, PA, 2Dept of Ag and Biological Engineering, The Pennsylvania State University, University Park, PA

Willow is grown for biomass as an alternative fuel and used on poultry and livestock farms as a vegetative buffer to scrub farm emissions (ammonia, dust and odor). These buffers can also be used as a screen to block the view of poultry barns to neighbors and to give farms a landscaped appearance. We compared chopped willow with pine shavings as bedding for Cobb x Cobb straight run broilers to 42 days of age. Twelve pens of day-old chicks (533cm²/chick) were alternatively assigned to willow (23kg/pen) or pine shavings (16kg/pen) pens. Birds were fed a commercial starter and grower diet and weighed at 21 and 42 days of age. Weekly, litter was scored (0-5) and at 2, 4, and 6wk litter moisture, pH and gas emissions (NH₃, NO, CH₄, CO₂) were measured. At 6wk broiler foot pads and breasts were scored for lesions and a sample of birds were processed for carcass wt and yield.

Results indicated no statistically significant differences between bedding treatments were measured for feed intake, feed/gain ratio or body wt at 6wk, averaging 1.79kg per bird. There were also no differences in mortality or carcass yield which averaged 5.0 and 7.6%, respectively. Weekly litter scores for birds housed on willow were lower averaging 3.10 vs. 2.47 for pine. Litter pH was not different between treatments for the fresh bedding (5.42), or at 4 or 6wk; but significantly less for pine vs. willow, 5.63 and 6.54, respectively at 2 wk. Foot pad lesions were low (0 = none to 3 = severe) but significantly greater for birds on willow at both pre- and post-processing. There were no differences in breast lesions between treatments. No significant differences in litter moisture or emissions were measured, however at 2 and 4 wks NH₃ emissions for chopped willow bedding were 47.0 and 41.8% less than pine shavings. Previous studies with willow bedding vs. pine indicated similar bird performance with better litter scores on willow and no difference in foot pad lesions. The wet and humid conditions for the trial herein made for poor litter scores in both treatments, however willow bedding appeared to reduce ammonia volatilization.

Key Words: willow, pine, litter, ammonia, emissions


Detailed monitoring of darkling beetle populations in broiler houses has shown a very different emergence and egg hatch timing than that observed in the mid 1980's. These studies were undertaken to examine the timing of treatment applications and subsequent success or failure to suppress darkling beetle populations. Experimental Design Two (2) 4 house broiler farms were monitored on a 2 week schedule by taking 10 one pint samples from 2 transects across brood and non-brood areas within each house. Beetles were returned to laboratory and enumerated by life stage. Treatment schemes were based upon the egg hatch (larval numbers) and adult emergence (adult numbers) and not related to age of birds or production schedule.

Key Words: Darkling Beetle, Alphitobius diaperinus, Life Cycle, Beetle control, Treatment program

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This study investigated the efficacy of intermittent surface sprinkling to cool broiler chickens on a commercial broiler farm. The objective of the study was to evaluate the broiler performance under the alternative supplemental cooling system and the sprinkling effect on litter conditions. Two overhead, low-pressure sprinkling systems were tested in two houses (treatment) during six summer flocks from 2009 to 2011, and compared to the evaporative cooling systems in two adjacent houses (control). The bird live weight, feed conversion, livability were not significantly different between the treatment houses and the control houses. The sprinkler houses had substantially higher air temperature but lower relative humidity than that in the control houses during day time in the test periods. Litter moisture conditions at the end of grow-outs were not significantly different. Cooling water usage in treatment houses averaged between 1/9 and 1/3 of those used in control houses. Intermittent surface wetting method in tunnel ventilated houses not only was effective in cooling broiler chickens without excessive litter moisture conditions, but also resulted in substantial less water usage for bird cooling.

Key Words: Broiler production, Heat stress, Surface wetting, Air quality, Cooling

M76 Monitoring thermal conditions and egg movement in the nest during natural incubation. Malcolm Mitchell1, Peter Kettlewell1, Roger Hoxey2, John Lowe1 1SAC, Edinburgh, Midlothian, United Kingdom (Great Britain), 2University of Birmingham, Birmingham, Warwickshire, United Kingdom (Great Britain), Royal Veterinary College, London, Hertfordshire, United Kingdom (Great Britain)

The requirement to accurately and reliably monitor the physiological responses and the condition of animals using techniques that impose minimal interference upon normal behaviours and activities has resulted in the development of a range of radio-telemetry systems. A device has been constructed to be of a similar size and weight to that of a chicken/duck egg thus allowing it to be placed in a nest to monitor conditions during natural incubation. The measured variables were dry-bulb temperature, relative humidity and the orientation of the ‘egg’. Temperature was measured by eight bead-type thermistors, of bonded into wells formed in the outer casing of the egg. Relative humidity was measured by solid-state humidity sensors. Orientation of the telemetric egg was determined by an array of accelerometers measuring the gravity vector. The performance of the telemetric egg was assessed by placing it in the nests created by a Red Crested Pochard, Netta rufina, and by a Mallard, Anas platyrhynchos. Data were transmitted from the ‘egg’ to a base station several metres away by a two-way radio link. The instrumented egg was accepted into the nest and was ‘incubated’ in the same way as other eggs. Values of the temperature, relative humidity and orientation of the ‘egg’ were sampled at a rate of one scan per minute throughout incubation. Output data include mean temperature, frequency of movement, periods of parental absence and egg cooling and warming rates. In these two trials the telemetric egg was reliable and was ‘incubated’ in the same way as other eggs in the clutch. It is proposed that this novel device can be employed in incubation studies in wild and domestic birds in nests and artificial incubator trials.

Key Words: Egg, incubation, temperature, accelerometers, telemetry

M77 The effect of dietary protein, feed ingredient and protease on performance, excreta pH, and nitrogen volatilization Roselina Angel1, Wendy Powers2, Todd Applegate3, Encarnacion Jimenez-Moreno1, Sergio Vieira1 1University of Maryland, College Park, MD, 2Michigan State, East Lansing, MI, 3Purdue University, West Lafayette, IN, 4Universidade Federal do Rio Grande Do Sul, Porto Alegre, RS, Brazil

Two experiments (Exp) were done to test tools to reduce nitrogen (N) excretion and emissions, Ross 708 broilers were used in these 11 to 21 d studies where diet treatments (Ttr) were replicated 5 times (6 birds/pen). In Exp. 1 a 2 x 2 factorial arrangement of protein level and protease (0 or 150,000 Protease units/kg) was used resulting in 4 diets. In Exp 2 a 2 x 3 factorial arrangement of protein level (control and low) and protease (0 or 150,000 Protease units/kg) and ingredient (SBM, meat meal (MM) and dis-
ABSTRACT OF PAPERS

M78 The effects of Saccharomyces cerevisiae fermentation products on breeder breeder and progeny performance
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Commercial strain heavy breeder breeder females were fed Saccharomyces cerevisiae fermentation products to determine the effects of supplementing breeder diets on subsequent progeny performance. 1140 Cobb 700 breeder chicks were assigned to three treatments: Control (Con) and Diamond V’s Original XPC™ (XPC) or XPC™ Ultra (Ultra) and placed in the rearing facility. Except for dietary treatments, the birds were reared as per the appropriate primary breeder guidelines. The birds were transferred to the breeder house at 19 weeks of age. Photostimulation began at 21 weeks of age. Dietary treatments continued during the breeder phase. There were 10 reps/treatment with 37 hens/rep and 4 males/rep placed with the hens. Chicks were produced from these hens and placed on litter in 9 reps/breeder dietary treatment and 21 chicks/rep. Progeny were processed for carcass data at 42 days of age. Progeny performance was measured as feed conversion ratio, body weight, and yield of carcass and parts. Through 43 weeks of age, egg production was numerically greater (P < 0.06) in the treatment diets (XPC=70.4±0.8% and Ultra=71.1±0.8%) in contrast to the Controls (Con=68.8±0.8%). Over the 18 weeks of egg production, this would result in approximately 2 or 3 more eggs per hen for XPC or Ultra treatments, respectively, versus Control hens. Progeny body weights tended (P < 0.17) to be higher at 42 d in the treatment diets (XPC=2547±40g and Ultra=2552±40g) versus Controls (Con=2479±40g). Breast meat yields (g/bird) were greater (P < 0.05) in the treatment diets (XPC=591±15g and Ultra=599±15g) in contrast to the Controls (Con=554±15g). Carcass yields at 42 days of age (g/bird) were numerically higher (P < 0.09) in the treatment diets (XPC=1851±38g and Ultra=1862±38g) versus Controls (Con=1772±38g).

Key Words: Saccharomyces cerevisiae, breeder breeder, progeny performance

M79 A dosimetry study of the effects of canthaxanthin in breeder breeders from 45 to 62 weeks of age
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Ross 344x708 breeder breeders that had been exposed to hot summer conditions were distributed into four treatment groups and given diets containing 0, 3, 6, or 9 mg canthaxanthin per kg diet from 45 to 62 wk of age. Average hatchability and fertile hatchability of the flock was 87.6% and 92.6%, respectively, at 44 wk of age. Approximately 56 females and 5 males were present in each of 16 slat-litter pens at 45 wk of age. Males and females were fed sex-separately a 15% CP, 2.9 kcal ME/g, 2.7% calcium diet amended with canthaxanthin with four replicate pens per dosage. Eggs were collected twice daily and 60 eggs per pen were incubated weekly. All unhatched eggs were examined macroscopically to determine fertility and/or stage of embryo death. From 45 to 62 wk of age, percentage hen-day production (49.1, 49.3, 51.6, 50.9), percentage fertility (94.7, 94.9, 95.3, 93.1), and percentage fertile hatchability (94.0, 95.2, 96.2, 95.3) exhibited a dose-related increase from 0 to 3 to 6 mg canthaxanthin per kg diet followed by a decrease at 9 mg/kg. These data suggested that the optimum dosage of canthaxanthin to support reproductive performance in older broiler breeders was approximately 6 mg/kg diet of both males and females.

Key Words: breeder breeders, hatchability, canthaxanthin, egg production, fertility

M80 Energy use in growing broiler feed increasing levels of dried distillers grains with solubles
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A balance trial and slaughter experiment were carried out to evaluate the nutrient retention, apparent metabolizable energy corrected to zero nitrogen retention (AMEn) and the energy used for protein and fat deposition (net energy: NE) in broiler chickens fed diets based on sorghum (S) or corn (C) and four increasing levels of dried distillers grains with solubles (DDGS). Fifty four male Ross B308 broilers from 28 to 42 d of age were used. Six broilers were slaughtered at the beginning of the study and the remaining 48 were assigned to the treatments in a complete randomized design with a factorial combination of the type of cereal and DDGS level. The experiment lasted 14 d during which 80 g of feed/bird per day were offered. The DDGS were included in the diet using the substitution methodology. The last four days of the study, total excreta were collected. At the end, birds were killed to determined de deposition rate and the energy retained in protein and fat. Broilers killed at the beginning of the trial were used to correct for the initial composition. There were six birds per treatment and results were subjected to ANOVA. The results indicate that the nitrogen retention was higher (P < 0.01) for S than for C, but the daily protein deposition rate (P < 0.05), the total protein content, the energy retained in protein and the efficiency of energy retained were higher (P < 0.01) for C. As the level of dietary DDGS increased, the excreted dry matter, nitrogen and energy increased (P < 0.01) but their retention linearly decreased (P < 0.01). The AMEn was also lower (P < 0.01) as the level of dietary