



UNIVERSITY OF SASKATCHEWAN

College of Agriculture
and Bioresources

DEPARTMENT OF ANIMAL AND POULTRY SCIENCE
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MSc Defence Seminar

The Effect of LED Light Flicker on the Welfare, Health, and Production of Layer Pullets Reared to 16 Weeks

Samantha McPhee

The objectives of this study were to determine the impacts of three light flicker frequencies (F) on the health, production, and welfare of two Lohmann strains (S). The tested F frequencies were 30, 90, and 250 Hz and the two S were Lohmann LSL-Lite pullets (LW) and Lohmann Brown-Lite pullets (LB). Pullets were reared in floor pens with perching systems from 0 to 16 weeks of age (wk). Each pen also contained two tube feeders and a drinker line. Production data collected included body weight (BW), flock uniformity, feed disappearance (consumed and wasted feed), and mortality. Welfare data collected included behaviour, location within the pen, fear response in a novel object test (NOT), tonic immobility (TI), and response to observer (RtO) test, serum corticosterone concentration (CORT) and heterophil to lymphocyte (H/L) ratio, and aggressive damage through treated pecking damage, comb score, and plumage score. Data were analyzed using Proc Mixed (SAS 9.4) and behaviour and location within pen were analyzed as repeated measures. Tukey's range test was used to separate means and differences were significant when $P \leq 0.05$. Pullets reared under 30 Hz spent a higher percentage of time (%t) at the feeder ($P < 0.01$), lower %t object pecking ($P = 0.05$), moved away from the observer less during RtO ($P = 0.05$), and had a higher percentage of mortalities due to "other" causes ($P = 0.02$) compared to those reared under 250 Hz. The 90 Hz treatment increased CORT when RIA analysis was used ($P = 0.02$). Numerous interactions were noted. With respects to F and age, 30 Hz decreased the %t pullets spent environmental pecking and on the perch at 4 wk ($P < 0.01$ and $P = 0.04$), suggesting an early age effect. The two S responded differently to F. A higher %t spent gentle pecking was seen with LB reared under 30 Hz compared to other treatments ($P < 0.01$). LB reared under 30 Hz spent the lowest %t on the perch ($P < 0.01$) and the highest %t on the floor ($P = 0.05$). LW spent less %t alternate perching compared to LB when reared under 250 Hz ($P < 0.01$). In the NOT at 7 wk, LW reared under 90 Hz had a longer latency to peck at the novel object compared to those reared under 30 or 250 Hz, a difference not seen with the LB ($P = 0.03$). At 8 and 16 wk, LB weighed more than LW under all treatments ($P < 0.01$ at both ages). Feed disappearance during the 8-16 wk period was highest for LB reared under 30 Hz ($P < 0.01$). Overall mortality was higher for LW reared under 30 Hz than LB reared under 30 or 250 Hz ($P < 0.01$) and mortality due to dehydration was higher for LW reared under 250 Hz than LW reared under 30 or 90 Hz, or LB reared under 30 or 250 Hz ($P < 0.01$; low incidence). Overall, the results suggest that 30 Hz can negatively impact pullet behaviour and fear responses at an early age and that 90 Hz negatively impacts fear response for LW and possibly CORT in the middle of the rearing phase. Effects of F on production were minimal and in some cases, S dependent.

Tuesday, November 28, 2023

1:00 pm

1E69 AGRI

Join Zoom Meeting:

<https://usask-ca.zoom.us/j/99668560869?pwd=c2l0akprTm1BZGV0SWJtbFkyZW50ZW50aWZlZz09>



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