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**Using accelerometers to examine differences in inactivity between conventional and slower growing broiler chickens**

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Selection for rapid muscle growth has led to larger, more efficient broiler chickens; however, conventional broiler chickens (CONV) experience health and welfare issues, which may cause or be caused by higher levels of inactivity. As such, there has been increasing interest in using slower growing broiler strains (SLOW) for commercial production. As part of a large-scale study, our objective was to compare the inactivity levels of 14 broiler strains (2 CONV, ADG<sub>0-47</sub> = 66-69 g/day; 12 SLOW, ADG<sub>0-61</sub> = 44-56 g/day). Each strain, raised under similar conditions (30 kg/m<sup>2</sup>), was assessed over 3 replicates, in 4 pens per replicate in a randomised incomplete block design. One male and one female per pen (n = 153 pens; 138 males, 142 females; 14-24 birds/strain) were outfitted with omnidirectional accelerometers (Actical®; frequency 0.035-3.5 Hz, range 0.05-2 G) to continuously monitor activity from day 22 to 46; accelerometers were previously validated through video analysis. The number of 15-second epochs with no activity were summed per day per bird and analysed using a repeated measures generalised linear mixed model. For analyses, SLOW strains were further categorised as fast SLOW (FSLOW, ADG<sub>0-61</sub> = 54-56 g/day), moderate SLOW (MSLOW, ADG<sub>0-61</sub> = 50-51 g/day) and slow SLOW (S-SLOW, ADG<sub>0-61</sub> = 44-48 g/day). Overall, CONV birds were inactive for 18.4 ± 0.6 h per day, whereas SLOW birds were inactive for 17.4 ± 0.6 h per day (p = 0.07). Inactivity increased with age (p < 0.01), and females were more inactive than males (p < 0.01). At the same age, CONV chickens were more inactive than S-SLOW chickens until day 35 (p < 0.01). At the same target body weight (~2.1 kg; d34 for CONV, d48 for SLOW), CONV birds were less inactive than S-SLOW (p < 0.01), M-SLOW (p < 0.01) and F-SLOW birds (p < 0.01), but the inactivity levels of the S-SLOW, M-SLOW and F-SLOW birds were similar (all p > 0.05). At a higher body weight (~3.5 kg; d48 for CONV, d62 for SLOW), there were no differences in inactivity between strain categories. Results suggest that strain differences in inactivity may initially be due to differences in the speed of growth, with later increases in inactivity due to both age and increasing body weight. Wearable accelerometers permit the continuous monitoring of broilers to identify activity patterns that may be proxies for welfare, such as long durations of inactivity, which may be associated with poor leg health or a reduced physical ability to perform natural behaviours.

**Key Words:** behaviour, broiler, slow grow, welfare