

Automated activity tracking in broilers and applications of the resulting individual-level data

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Broilers are often kept in large groups, are similar in appearance and are difficult to monitor individually. However, individual-level data on activity can be informative for health, welfare and performance, and for breeding programs. Therefore, automated approaches for tracking broiler activity are required. In earlier work, a radio frequency identification system was implemented to track broiler activity throughout life, in a 4.7 m² pen, in five production rounds (~80 birds/round). Broiler activity levels were determined using a grid of antennas underneath the pen and tags fitted to the broilers' legs, based on recorded positions over time. With the resulting individual-level activity data (average distances moved per hour for each day), the relationship between activity in the first two weeks after hatching and average daily weight gain (**ADG**) was examined and genetic parameters for activity were estimated. For the examination of early life activity and ADG, data from 318 birds with daily activity records were used. We observed no statistically significant relationships between ADG and the mean, skewness, autocorrelation or entropy of (deviations in) activity. However, there was a negative relationship between ADG and the root mean square error of activity (estimate = -1.08, p = 0.011), indicating that birds that are more variable in their activity levels early in life show a lower ADG across the full production period. Potentially, this variation in activity is linked to variation in feeder visits and subsequent feeding, but this requires further investigation. A heritability of activity across the full production period of 0.31 (\pm 0.11) was observed, based on data for 387 broilers, indicating that there is potential to select for activity in broilers. Current work focusses on scaling up the activity tracking to larger groups through combination with video recordings, to allow for fast and objective phenotyping of broilers throughout life.