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Using automated recordings of broiler activity levels to assess individual gait

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Gait is an important trait to record in broilers, as it provides information on birds' leg health. There is potential to breed for better leg health. Therefore, individual records of gait can be of great relevance for breeding programmes. It is, however, time consuming to manually score gait of many individuals, so there is a need for an automated approach. One trait that might have potential to serve as a proxy for gait is locomotor activity, e.g. distances moved. Our previous work has indicated that both an ultra-wideband (UWB) tracking system and a passive radio frequency identification (RFID) tracking system can track individual distances moved in broilers, with Spearman rank correlations with distances on video of 0.79 (95%-CI 0.53-0.92, P<0.001) and 0.82 (95%-CI 0.61-0.92, P<0.001), respectively. To study whether the recorded distances from these systems can provide indications for gait, we implemented the UWB system to record activity from approximately 16 to 32 days old and manually scored the gait of broilers. Using data on 120 broilers, we observed that good gait birds on average moved approximately 2.24 meters per hour more than suboptimal gait birds (robust linear regression, P=0.007). When taking body weight at two weeks old into account, we observed that this difference in activity between gait classifications was only clear in lightweight birds, but not in heavyweight birds. It has to be further investigated if this is a consequence of higher body weight already limiting activity levels. To gain better insight into the relationship between activity and the development of gait problems, longitudinal activity recordings from hatching onwards are needed. To this end, we are currently implementing the RFID system to record broiler activity throughout life, combined with periodical gait assessment.