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Development of a Wireless Body Mounted Sensor to Monitor Location and Activity of Laying Hens in Non-cage Housing Systems

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Abstract: Accelerometer, Cage-free, Laying hen, Poultry, Proximity sensing, Relative RSSI, Wireless monitoring, Wireless network A novel wireless body-mounted sensor was developed to remotely monitor the location and activity of laying hens within non-cage housing systems. Legislation and social demand in the U.S. and Europe is pushing the poultry industry to transition primarily to non-cage housing systems. However, non-cage systems typically house hens in groups of tens of thousands, which makes it nearly impossible for caretakers to visually assess the health, welfare, or movement of all individual hens or to follow a particular hen over time. In the present study, laying hens were fitted with a lightweight (10 g) wireless body-mounted sensor to monitor their location in space relative to key resources and general level of physical activity. Sensor data were validated by correlating them to video-based observations of the sensor-wearing hen. In experiment 1, overall agreement of at least 84% was consistently obtained between data from the sensor system and video concerning the hen's proximity to specific resources including nestboxes, perches, water, and feeder. Presented data were collected from three 30 min observations from each of three laying hens. In experiment 2, the accelerometer data from a back-mounted sensor were correlated to video-based observations from two 30 min observation sessions from each of two laying hens in order to demonstrate the feasibility of automated activity classification using the developed sensor system.