SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: CA15224
STSM title: Individual activity tracking of laying hens
STSM start and end date: 11/08/2019 to 24/08/2019
Grantee name: Vere Leybaert

PURPOSE OF THE STSM:
This research project focused on individual laying hen behaviours and tracking laying hen activities across time and space with minimal intervention and disturbance. Many efforts have been made to monitor individual bird behaviour and activity with different methodologies. Research by Siegford *et al.* (2016) showed that it is possible to classify accelerometer data into specific behavioural activities. Data was collected from accelerometers placed on back of the hens for best signal capture. However, Daigle *et al.* (2012) found that changes occur in feeding, drinking and nesting behaviour by laying hens as a consequence of tracking devices worn at the back. To overcome this issue, we were interested in assessing the potential to classify different broiler behaviours based on accelerometer data, worn on a leg ring or on a collar. A special focus was to be put on distinguishing feeding behaviour from other activities. To do this we would combine accelerometer data with video recordings giving information on the location and activity of the birds. The M3BIORES research team from the KU Leuven are having 6 small leg ring and collar devices for chickens with integrated accelerometers and temperature sensors at their disposal for this purpose.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS
A tour and introduction to the Research Centre for Proper Housing was given on the first day. The legrings with accelerometers were attached to the chickens of the "sick pen" (= pen with chickens to replace sick chickens in other experiments). Due to a lack of approval for the use of collars on the chickens, the accelerometers that were meant to wear on the collar were also placed on a legring for this experiment, as displayed in the photos below. The 6 hens that were wearing an accelerometer were visually marked with a numbered backpack to be able to identify the chickens on the video images. 1 Camera was installed in the corner of the pen to maximise the view over the pen and to minimise blind spots. The videorecording was on for 5 days and 4 nights. After 2 days it seemed that the accelerometers were not recording as they should. Therefore they were taken off and reset before they were put back on. On Friday the accelerometers were collected again and the data was downloaded from the devices. Video recordings were stopped on Friday as well. After the weekend the accelerometers were put back on and the recordings were started again. The video recording and acceleration measurements were done for 5 consecutive days. During the second week of the experiment the different behaviors of the laying hens were labelled in the video data of the first week. Simple plots of the accelerometer data were made as well. Further labelling of the video data and coupling of the hens' behaviors with the accelerometer data is planned to be done in the coming weeks/months.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

As most of the data analysis is still to be done, no formal results and conclusions can be drawn yet. Raw acceleration data in the 3 perpendicular directions (x, y and z) is available for 2 days of the first week and 5 days of the second week. Video images, showing the behavior of the 6 hens wearing the accelerometers, is available of 5 days of the first week and 5 days of the second week. The behavior of the chickens will be labelled in the different videos and will then be coupled with the corresponding accelerometer data in order to develop an algorithm that classifies hen behavior purely based on acceleration measured at the hen's leg. Different calculations and combinations of the 3 different directional accelerations will be tested to obtain the best behavioral classifications.

FUTURE COLLABORATIONS (if applicable)
The conducted work will be considered on a larger scale if findings are positive