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An evaluation of body cameras for remote animal welfare assessments

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THE NEED FOR REMOTE ANIMAL WELFARE ASSESSMENTS

Pig welfare assessment is time consuming for producers and audits can increase biosecurity risks if external assessors access barns to perform direct visual observations. Video footage recorded with body cameras by barn personnel could present an option for supporting remote animal assessments; footage could be reviewed by producers in their own time as a monitoring tool or submitted for animal care quality assurance assessments reducing time, costs and biosecurity risks.

Objective

This project evaluated the use of body cameras as a tool to support on-farm animal welfare assessment (BC300, PRO-VISION® Video Systems, Byron, MI), comparing assessment by video to direct visual assessment for the measurement of select pig welfare indicators (cleanliness, skin lesions, tail lesions and fear of humans).

ACKNOWLEDGEMENTS

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EVALUATION OF BODY CAMERAS



Figure 1. Pen level evaluation: (A) Small pen and (B) large pen

Video footage collected and live assessment performed on small pens (12 pigs/pen) in the nursery, grow and finish stages (n = 6-12 pens/stage; Fig 1 A), and one large finisher group pen (179 pigs; Fig B) over two days.



Figure 2. Individual pig evaluation

To evaluate the ability to track lesion development and recovery, 24 individual finisher pigs were repeatedly observed: day 0 (unmixed), day 1, 3 and 7 after mixing.



Figure 3. Systematic scan of pens with body cameras attached to a clear clipboard

For 10 minutes, cameras systematic scanned pens (Fig 3), while two observers conducted assessments directly and from the footage. Weighted kappa coefficient and intra-class correlation (ICC) were used to understand the technical performance of the camera, comparing the agreement between scores from live vs video assessments. These techniques were also used to assess observers performance.

RESULTS & DISCUSSION

Pen level evaluation



Figure 4. Pen level screenshots from videos to assess pig welfare indicators. A & B small pens, B is zoom in. C is a large pen.

For small and large pens (Fig 4), cleanliness (K=0.69-1.00), skin (ICC=0.76-0.70) and tail lesions (ICC=0.99-0.93) showed a substantial to almost perfect agreement; while fear of humans showed a moderate agreement (K=0.42).

Individual pig level evaluation

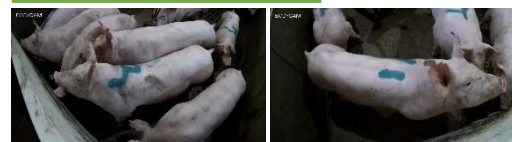


Figure 5. Individual level screenshots from videos to assess pig welfare indicators (without zoom).

At the individual pig level (Fig 5), cleanliness (K=0.53) and skin lesions (ICC=0.79) showed a fair to moderate agreement; while tail lesions and fear of humans showed 92 and 75% agreement, respectively.

Agreement between observers

This was dependent on the type of evaluation, observation (direct or video), and variable. At pen level, there was a slight to almost perfect agreement (cleanliness: K=0.63-0.77; skin lesions: ICC=0.72-0.60; tail lesions: 0.99 -0.99; fear of humans: 0.26 to 0.10). At individual level, observers had a substantial agreement for skin lesions (ICC=0.70-0.74), however, the other variables could not be calculated due to asymmetry of the data (cleanliness: 57.3 – 68.4%; tail lesions: 0.99 -96%; fear of humans: 98.9-49.5%)

Video assessment of animal welfare indicators using body camera footage provided similar values to assessments performed by direct visual observation. Further validation in a variety of commercial farms would be valuable to evaluate the robustness and consistency with which information on a wide range of welfare indicators could be measured under varying conditions. Where moderate agreement occurred in scores, it highlights the importance of a systematic training program for assessors to support animal welfare assessment performance.

TAKE HOME MESSAGE

Body cameras show promise as a reliable and cost-effective option as a tool to support on-farm pig welfare assessments at pen and individual level remotely, reducing biosecurity risks.