

**Title:** Using objective behavioral measurements to build robust producer tools for detecting, scoring and treating lameness in sows – **NPB #09-251**

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### Scientific Abstract:

The objective of this study was to develop validated, objective tools able to discriminate between sows in a painful and non-painful lameness state. Tools assessed included plasma cortisol, embedded microcomputer force plate system, GaitFour<sup>®</sup> walkway system, Mechanical Nociception Threshold (MNT) and Thermal Nociception Threshold (TNT) tests. A total of 24 mixed parity sows ( $220.15 \pm 21.23$  kg) were individually housed. All sows served as their own control and treatment. On D0, sows were induced lame using a chemical synovitis model. After completion of the first round, sows were given a 7d rest period and then the trial was repeated with the other rear hoof being induced lame. Three treatment days were compared (1) *sound* (day before induction: D-1), (2) *most lame* and (3) *resolved* (first and sixth day after injection of amphotericin B). *Cortisol* was elevated on most lame days compared to sound and resolved days. For the *Prototype Embedded Microcomputer-based force plate system* weight placed on the injected hoof decreased on the most lame day ( $P < 0.05$ ). *GAITFour<sup>®</sup> pressure mat gait analysis walkway system*; **Stride Time** increased on most lame day for all hooves ( $P < 0.05$ ) and returned to baseline levels by the resolved day. **Stride Length** decreased on most lame day compared to baseline levels ( $P < 0.05$ ). All hooves (except RF when RH induced lame) returned to baseline levels by resolved day (Table 6). **Maximum Pressure** placed on the induced hoof decreased on the most lame day compared to baseline levels ( $P < 0.05$ ). **Stance time** increased for all sound hooves between sound and most lame day ( $P < 0.05$ ). *Mechanical Nociception Threshold test* pressure tolerated by the lame hoof decreased for every landmark ( $P < 0.05$ ) when comparing sound and most lame days. The sound hoof tolerated more pressure on most lame and resolved than on baseline sound day ( $P < 0.05$ ). *Thermal Nociception Threshold test* tolerated by the sound hoof did not change over the 3 treatment days ( $P > 0.05$ ). However, the sows tolerated less heat stimulation on their lame hoof on most lame day compared to baseline levels. Therefore, in conclusion, the physiology, kinematics and pain sensitivity tests all detected changes when sows were sound and in acute lameness states and show promise for on farm application.

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