A Comparative Study of Hoof Growth in Sows When Housed in Individual Stalls: How Does Parity Affect This?

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Summary and Implications

Lameness has been incorrectly labeled as a "*cow and not a sow*" concern, and this has possibly arisen due to the majority of sows being far more stationary over their productive lifetime compared to dairy cows. Therefore, the objective of this study was to determine the rate of weekly lateral toe growth for parity one through three sows when housed in gestation stalls during a one month period. A total of 30 sows were used (Yorkshire [n = 3], Duroc [n = 14] and Yorkshire x Duroc crosses [n = 13]). There were 10 parity one sows (158.8 kg to 204.1 kg), 10 parity two sows (181.4 to 226.8 kg), and 10 parity three sows (204.1 to 249.5 kg) respectively. All sows were individually housed in stalls. Weekly lateral toe growth measurements were collected once a week by a single observer. Weekly lateral toe growth data were analyzed as repeated measurements with sow as subject using the PROC MIXED procedure of SAS. Average hoof growth was 1.2 mm per week (range between hoofs was 0.3 to 2.0 mm). Significant effects of hoof growth were reported for parity ($P < .0001$). The lateral toes from parity two sows grew faster when compared to sows from parity one and parity three. In conclusion, parity two sows showed a slightly accelerated rate of hoof growth. Although increased growth rate was relatively small, this data could be beneficial information from the production standpoint. Producers may choose to watch their parity two sows more closely for hoof overgrowth. Properly trimmed hooves have a reduced risk of catching on slats, cracking, and causing injury to the animal. If hoof overgrowth is monitored closely, it is possible that less lameness and locomotory problems will occur.

Introduction

Lameness has been incorrectly labeled as a "*cow and not a sow*" concern, and this has possibly arisen due to the majority of sows being far more stationary over their productive lifetime compared to dairy cows. A precise number of affected gilts and sows classified as lame at this time remain unknown, but a few studies have begin addressing what can affect hoof health, for example dietary manipulations, flooring structures and genetics. Second, how quickly the hoof grows and repairs itself is important and one that could affect the sow and boars longevity within the herd. Hahn et al. (1986) reported that dairy cows in confinement had a higher growth rate than cattle on pasture, and also that hoof growth rate increased in the spring and summer months. However, there is little information detailing how quickly the hoof grows in the sow and boar when housed in a confinement facility typically used in the U.S. Therefore, the objective of this study was to determine the rate of weekly lateral toe growth for parity one through three sows when housed in gestation stalls during a one month period.

Materials and Methods

Animals and location: The project was approved by Iowa State University's Institutional Animal Care and Use Committee (log number; 7-08-6586-S). A total of 30 sows were used (Yorkshire [n = 3], Duroc [n = 14] and Yorkshire x Duroc crosses [n = 13]). There were 10 parity one sows (158.8 kg to 204.1 kg), 10 parity two sows (181.4 to 226.8 kg), and 10 parity three sows (204.1 to 249.5 kg) respectively. Sows ranged from their first to fifth week of gestation. Sows were obtained from a single source farm that had a history of producing pigs serologically negative for PRRSv (Porcine Reproductive and Respiratory Syndrome virus) and *Mycoplasma hyopneumoniae*. The study was conducted in the months of July and August, 2008 at the Lauren Christensen Swine Research facility in central Iowa.

***Diet, housing and husbandry*:** All sows were individually housed in stalls (2.1 m in length x 0.6 m wide x 1.1 m height; Eastern Iowa Pork Inc., Earlville, IA). Concrete flooring was under each stall, and manure fell into a holding pit that was 61 cm deep. The environmental temperature was regulated by large fans suspended from the ceiling. Sows were feed at 0600 h once a day a commercially available ground feed (1450 kcal per kg, 13 % crude protein) formulated to meet requirements (NRC, 1998). Ground feed was provided in a water/feed combination trough (61 cm length x 33 cm width x 10 cm height) with a capacity of 8.2 kg per pen. Caretakers observed all sows twice daily, at 0600 h and 1600 h.

Climate: Ambient temperatures were recorded using a weather station (WPS Series, Texas Weather, Dallas, TX) located in Madrid IA. Measurements were recorded at 20

min intervals. Over the trial average temperatures were 24.5 ^{o}C, relative humidity 71.8 %, resulting in a Temperature Humidity Index of 73.3. Average wind velocity was 5.2 km / h with a total precipitation of 20.7 cm respectively.

Treatments and experimental design: A total of 30 stalls were used during this trial (containing a sow) and the sow was the experimental unit. The sows were selected for inclusion in this study based on (1) parity, (2) stage of gestation for sows and (3) breed.

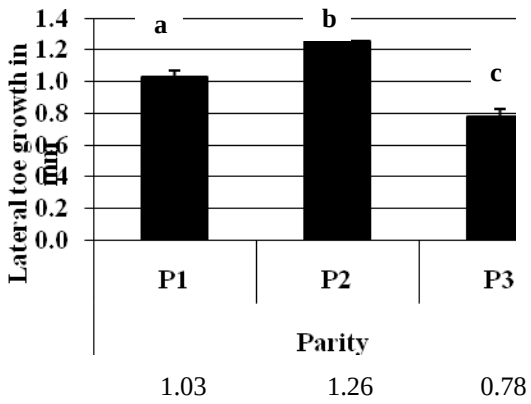
Weekly lateral toe growth; Weekly lateral toe growth measurements were collected once a week by a single observer. On the first day of the trial (d 0), all sows were forced to stand and each lateral toe (both front and both rear lateral toes) were marked with a Fearing® paint marker (Digital Angel Corporation, Animal Applications Division, St. Paul, MN) at the coronary band (defined as location where the hair stopped growing on the leg and the horny tissue of the toe begins). Over the next four consecutive weeks (every Monday), lateral toe length from all four feet were measured for all sows, while in the standing position. Lateral toe growth was measured in mm from the initial mark at d 0 to the coronary band using a tape measure (Bassett, Promopeddler.com).

Statistical Analysis: Weekly lateral toe growth data were analyzed as repeated measurements with sow as subject using the PROC MIXED procedure of SAS (SAS Inst. Inc., Cary, NC). Fixed effects in the statistical model included parity of sow (one, two or three), location of the lateral toe (front or rear), sow side for the lateral toe (right or left), breed (Duroc, Yorkshire, Duroc × Yorkshire [Crossbred]) and week (one through three). A completely randomized statistical design was implemented, $P < 0.05$ was considered significant and PDIFF was used to separate the means. Due to missing values only data from 3 weeks were included in this analysis. Final data included 120 feet from 30 sows.

Results and Discussion

Average hoof growth was 1.2 mm per week (range between hoofs was 0.3 to 2.0 mm). Significant effects of hoof growth were reported for parity ($P < .0001$). The lateral toes from parity two sows grew faster when compared to sows from parity one and parity three (Figure 1).

Figure 1. Hoof growth (in mm) by parity of sow (parity 1 = 10; parity 2 n = 10; parity 3 n = 10) over July and August, 2008 at the Lauren Christensen Swine Research facility in central Iowa. Least square means with a different letter (a, b, c) differ ($P < 0.0001$).



In conclusion, parity two sows showed a slightly accelerated rate of hoof growth. Although increased growth rate was relatively small, this data could be beneficial information from the production standpoint. Producers may choose to watch their parity two sows more closely for hoof overgrowth. Properly trimmed hooves have a reduced risk of catching on slats, cracking, and causing injury to the animal. If hoof overgrowth is monitored closely, it is possible that less lameness and locomotory problems will occur.

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