

**Final Report to the Pennsylvania Soybean Board for Grant – R2011 – 003**

***Insuring the long-term viability of swine farming with husbandry systems designed to meet the changing demands of society.***

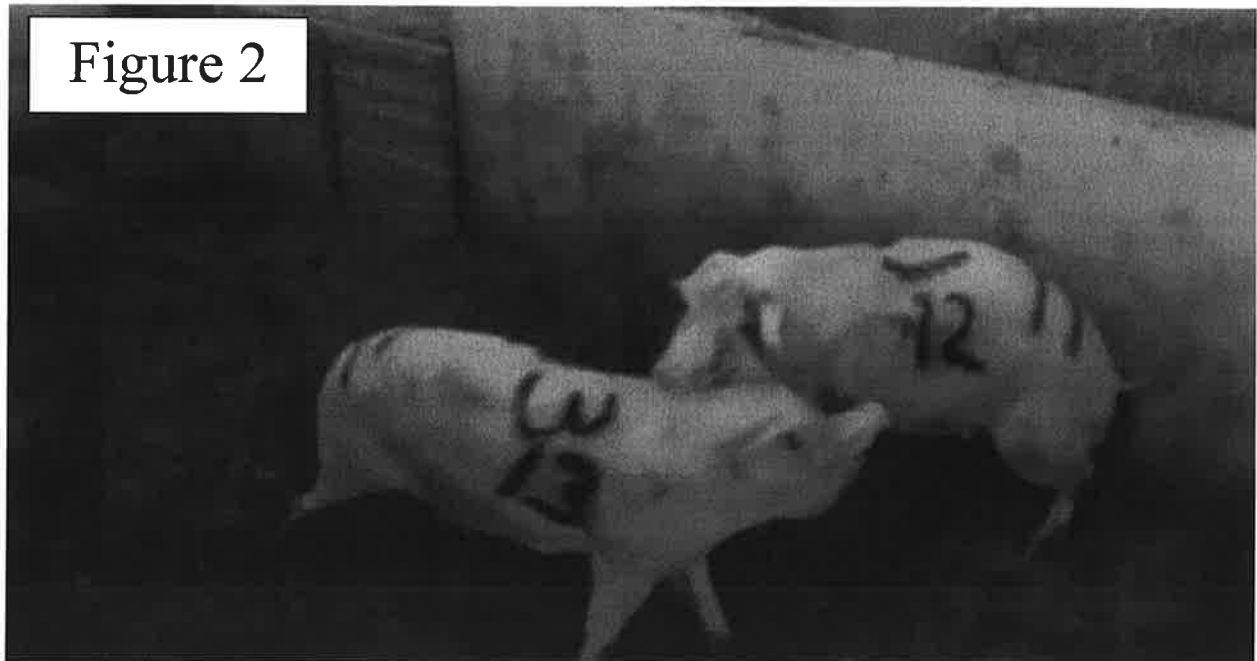
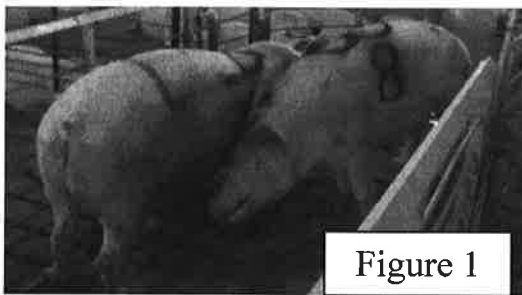
The research proposed in this grant addresses vexing problems in swine production and health with an eye towards keeping Pennsylvania swine farmers competitive and opening new doors for sustaining or expanding the number of pigs feeding on soybeans in the state of Pennsylvania. The question of social acceptance is a somewhat new to our swine farmers. Mounting societal concerns about modern agriculture has fueled the efforts of animal advocates who are seeking sweeping reforms of today's agriculture. While well intentioned, often these agendas are not well supported by science, and have the potential to actually decrease animal welfare and or drive producers out of business. It is important to evolve our husbandry systems to meet the expectations of our customers; however, these changes need to be based on knowledge and not emotion. In some cases, there exists knowledge gaps between what consumers want and what producers can cost-effectively supply. Our research aims to help close this gap and better define commercially viable alternatives to current production systems.

An overarching objective of our research program into socially acceptable husbandry practices has been to better understand the differences between individual sows housed in pen gestation. This requires extensive behavioral phenotyping which is best achieved by video documenting the sows performing their inherent behaviors and then carefully analyzing these behaviors in slow motion as the videos are replayed off-line. The funds for this grant were committed to providing the video infrastructure required to carry out such analysis. This resource is being used in several studies and was helpful in leverage additional funding from outside agencies such as the National Pork Board.

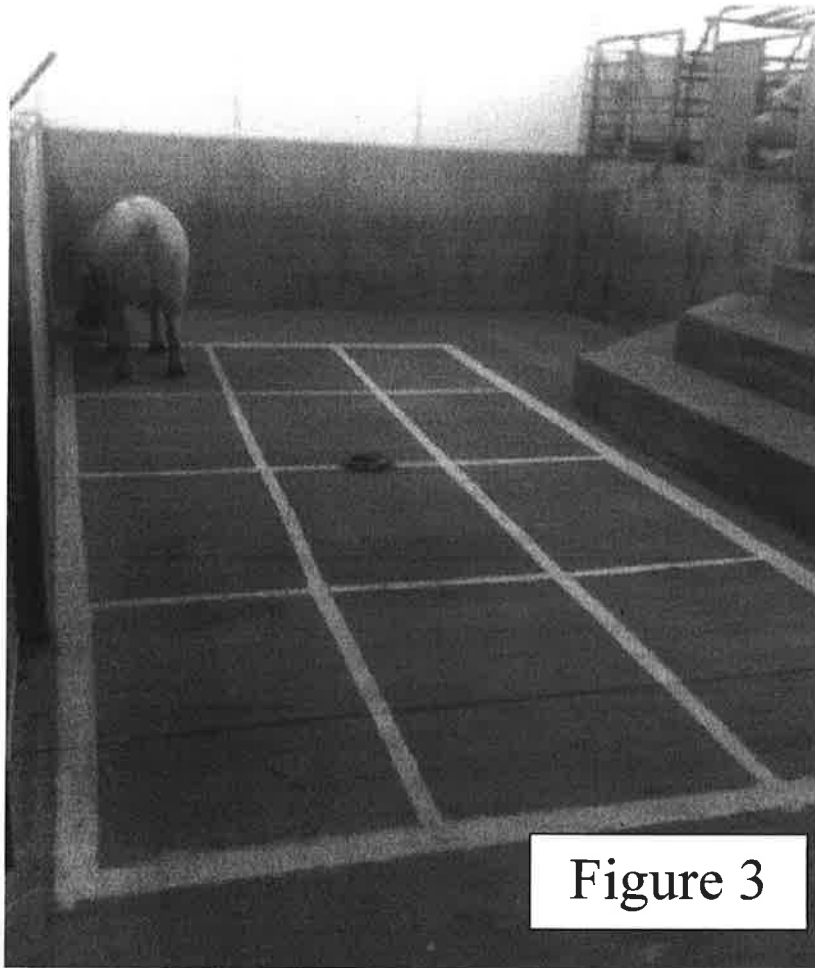
Attached are several examples of how the video system is used are described here:

- A) Mixing:** The introduction of ten newly bred sows into the large gestation pen is a high arousal event involving increased aggression levels. This antagonism is due to the re-establishment of social rank and grouping by the ten "new" individuals. Pilot data

indicates that the occurrence of fighting is highest among the new individuals. In order to measure the aggressive behavior rates for each of the ten new individuals, video cameras follow the sows for one hour following introduction. The ten will be introduced to the pen in two groups of five, with a single camera focusing on a single sow. Video data will be coded for specific occurrences of: number of aggressive behaviors initiated, number of aggressive behaviors received, and the latency to enter the large pen. An examples of shoulder pressing is seen in Figures 1 and a bite in Figure 2.



**B) Novel Arena:** Every Monday, following the Friday introduction to the large pen,

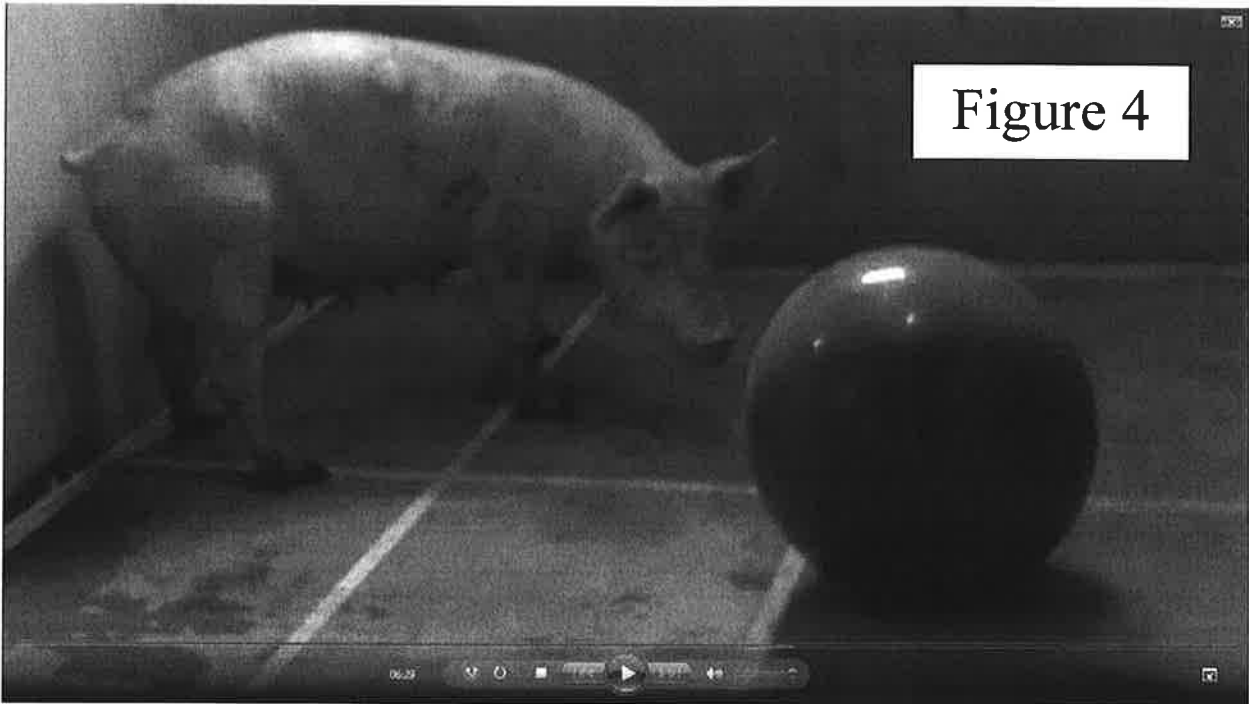


each sow is observed for behavior responses to a novel arena and a novel object. An unused portion of the large gestation pen, far from the animals, was sectioned off as the experimental arena. The concrete floor was painted into 16 4ft x 4ft squares (See Figure 3). Each sow is filmed for five minutes once it enters the grid-lined arena and the gate is closed behind it. A video camera records the animal's

activity in the arena. Subsequent video analysis will focus on the number of lines the sow crossed (an estimate of activity levels), and the number of exploratory behaviors (i.e., sniff, lick) for the five minute period.

**C) Novel Object:** Immediately following the five min novel arena experiment, a novel object is placed in the middle square of the grid-lined floor. The sow will be filmed for another five minutes. Subsequent video analysis will focus on the latency to approach the object, as well as the rate of number of contacts with the object for the five minute period. Objects to be used

include a large orange traffic cone and a large blue plastic ball (See Figure 4).



Taken together these and other behavioral observations provide basis upon which we will be identifying the needs of individual sows and improving the pen gestation systems to better meet their needs.