

NCERA-219 Annual Virtual Meeting

November 14-15th, 2022

Attendees: Dale Rozeboom, Lee Johnston, Ryan Samuel, Marcia Shannon, Brian Richert, Richard Gates, Merlin Lindemann, Gary Apgar, Jeff Wiegert, and Brett Ramirez

Absent: Benny Mote, Chris Byrd, Bob Goodband and Bob Thaler

Agenda:

Monday, November 14th 3:00 to 5:00 PM

- 3:00 Welcome – Past Chair Marcia Carlson and (or) Current Chair Dale Rozeboom
- 3:05 Station reports (written reports circulated to committee member prior to meeting are encouraged)
- 4:00 Current projects
- 4:30 Administrative advisor report
 - Discussion of future NCRA expectations of committee function and productivity
- 5:00 Day 1 concluded

Tuesday, November 15th 9:00 to 11 AM

- 9:00 Committee organization
 - 2023 officer elections
 - 2023 meeting date and location
- 9:15 New research projects/development of grant proposals
- 11:00 Day 2 concluded

The meeting was called to order at 3:00 pm.

The 2022 Chair Dale Rozeboom welcomed everyone.

Station reports were provided by Dale Rozeboom (Michigan State), Merlin Lindemann (Kentucky), Brian Richert (Purdue), Marcia Shannon (Missouri), Ryan Samuel (South Dakota State), Gary Apgar (Southern Illinois), Lee Johnston (Minnesota), Jeff Wiegert (Texas A & M), and Brett Ramirez (Iowa State).

Meeting was adjourned at 5:00 pm.

Day 2 Meeting was called back to order at 9:00 am

Dale Rozeboom welcomed everyone back.

Richard Gates (Iowa State) provided a brief update on his current position.

Research ideas were discussed and focused on current commercial industry issues and changes. Ideas included:

- 1) NUTrack livestock monitoring technology such as current research on tail biting and ability to estimate body weight or condition

- 2) Evaluate initial set points in wean-to-finish barns (first 2-weeks) impact on subsequent performance like the reduced nocturnal work previously conducted with the additional impact on energy use/carbon footprint.
- 3) Evaluation of breeding sows and immediately mixing then after serve as related to Proposition 12 and time allowed in stalls.
- 4) Modeling as related to EPA and emissions,

Election of officers and next year's meeting was discussed. Thoughts were to move annual meeting time to the Spring (May 2023). Discussion focused on meeting in Sleepy Eye, MN to tour Hubbard's nursery research facility and possible 2024 touring the cooling mats with sows once installed commercially.

Jeff Wiegert was unanimously elected as the 2023 chair.

Suggestions were made to invite at least one animal welfare specialist to the committee. Dale Rozeboom was going to make contacts.

Meeting was adjourned at 10:00 am.

Respectfully submitted, Marcia Shannon

University of Kentucky
Swine Nutrition and Management Research
NCERA-219, Zoom meeting
November 14/15, 2022

~~Personnel~~

Research:

Nutrition: Merlin Lindemann, Sunday A. Adedokun

Digestive Physiology: Jamie Matthews (now Assoc Dean Research) **Meats:** Gregg Rentfrow

Microbiology: Melissa Newman

Research Specialist: Tyler Chevalier

Extension: open position

Graduate students in swine nutrition: *PhD:* Tyler Chevalier (University of Kentucky), Richard Adefioye (Obafemi Awolowo University, Nigeria).

MS: Duncan Paczosa (University of Nebraska), Megan Bauer (University of Kentucky).

~~Research Facilities~~

The UK Swine Research Unit is at the C. O. Little Agricultural Research Center located between Versailles and Frankfort, approximately 15 miles west of Lexington. The three-site production facility (Headquarters-Breeding-Gestation-Farrowing; Nursery; Grow-Finish) will accommodate 120 sows as part of the production herd, utilize all AI (PIC purchased boar semen), and 3-week weaning. At full capacity, we can finish about one-half of the pigs that are farrowed.

Research space for nursery pigs, grow-finish pigs, gestating/lactating sows, metabolism crates and battery cages are available on campus in the W. P. Garrigus Building.

~~Research Activity in Swine Nutrition~~

~~Weanling Pig Research~~

- **Preference of Pigs for Various Sources of Rendered Animal Protein Byproducts.** Feeding animal byproducts (PBM or MBM) up to 5% of the diet had no effect on overall performance of nursery or grower pigs, indicating they are an acceptable option as a feed ingredient. Both animal byproducts performed well when started in the nursery diets immediately at weaning but less so when started 7 days postweaning, implying that these products need to be added in the first nursery diet rather than the later nursery diet. Pigs demonstrated a preference for the animal byproduct-free diets when given a choice, but pigs definitely preferred either PBM or MBM over the SDPP when given that choice. In grower studies, both animal products performed well (equal to SBM) with no observable advantages or disadvantages
- **Mycotoxins in Young Pig Diets.** Fines obtained by using a grain cleaner on some less-than-good corn from 2020 are being dose titrated into nursery diets 2 weeks after weaning at levels of DON, fumonisin, and zearalenone that approach FDA cautionary levels. Both performance and preference is being evaluated. Chick studies are also planned. The toxin analysis was done at the NDSU Veterinary Diagnostic Laboratory and is provided below. Future studies may evaluate commercial amendments when appropriate supplementation levels are determined.

		Uncleaned corn	Cleaned corn	Fines
Afla B1	20 ppb	<20	<20	<20
Afla B2	20 ppb	<20	<20	<20
Afla G1	20 ppb	<20	<20	<20
Afla G2	20 ppb	<20	<20	<20
Fumonisin B1	200 ppb	3826	1884	26184
Fumonisin B2	200 ppb	1179	499	7182
Fumonisin B3	200 ppb	345	206	2033
HT-2 toxin	200 ppb	<200	<200	<200
T-2 toxin	20 ppb	<20	<20	<20
Ochratoxin A	20 ppb	<20	<20	<20
Sterigmatocystin	20 ppb	<20	<20	<20
Zearalenone	100 ppb	382	~126	2388
Vomitoxin (DON)	200 ppb	1475	716	7328
15-ADON	200 ppb	<200	<200	428
3-ADON	200 ppb	<200	<200	<200

~~Growing-Finishing Pig Research~~

- **Second iron injection to nursery pigs.** A second iron injection was given about d 8 and the pigs followed through to market weight. The +Fe pigs had a greater Hb at weaning (13.1 vs. 10.7 g/dL, $P < 0.0001$) and end of the nursery (12.1 vs. 11.7 g/dL, $P = 0.01$) compared to CON pigs. During the finisher period, +Fe pigs had a greater ADG ($P = 0.05$). Overall, +Fe pigs had ~ 4% increase in ADG ($P = 0.04$) from weaning to slaughter. The cumulative improvement in ADG from weaning to slaughter observed for +Fe group resulted in +Fe pigs having a heavier BW at the end of the experiment (115.77 vs. 112.79 kg; $P = 0.04$). Following slaughter, +Fe pigs had ~ 2.5% heavier cold carcass weight (82.99 vs. 80.93 kg; $P = 0.34$) and trimmed loin (10.67 vs. 9.95 kg; $P = 0.04$) compared to the CON pigs.

~~Sow Research~~

- **S-1081 objective - boron.** Sows assigned to the boron objective in early 2020 have completed the project; data remains to be analyzed both in the lab as well as statistically. Some of the responses relate to bone measures; a chick study is also being conducted that evaluates growth performance and bone measures.
- **Preference of Sows for Various Sources of Rendered Animal Protein Byproducts.** Nursery pig work will soon be followed up with sows.

University of Minnesota Station Report
NCERA-219 Committee Meeting
University of Minnesota
11/14/22

Research Projects

Integrating hybrid rye as a winter annual crop into organic pig production

PI's: Li, Johnston, Tallaksen, Lazarus, Wilson, Cox

This project is designed to evaluate the use of hybrid rye in a certified organic pig production system. We are evaluating agronomic, nutrient cycling, pig performance, pork quality, economic, and management system aspects of using hybrid rye to reduce feed costs in organic pig production. This is a three-year project initiated in the fall of 2021. Rye is grown at WCROC for this project and production facilities have been modified and certified for organic pig production.

Funding: USDA OREI grant and KWS

Utilization of computer vision as a means to understanding the etiology of tail biting outbreaks in growing-finishing pigs

PI's: Li, Johnston, Mote (UNL), Schmidt (UNL)

This three-year project will utilize the advanced computer vision platform (NUtrack System) to understand the complex etiology of tail biting and provide early recognition of tail biting outbreaks in pigs. Our objectives are: 1) Utilize an advanced computer vision platform to identify changes in postures and activities associated with tail biting outbreaks (TBO) to predict and prevent TBO through early intervention; 2) Characterize behavioral patterns of tail biters and victimized pigs for early identification of these pigs; 3) Evaluate social positions of pigs involved with tail biting and their roles in the development of TBO; 4) Assess stress and immune status of individual pigs that may predispose them to tail biting events; and 5) Visually identify tail biting events from processed video to develop AI and machine learning programs that will be capable of autonomously identifying tail biting events and associated pigs. Three experiments will be completed at the University of Minnesota and University of Nebraska-Lincoln. This project began late in 2021.

Funding: USDA NIFA

Effects of water quality on nursery pig performance and health

PI's: Johnston, Gomez, Urriola

The focus of this project is to determine the influence of water quality on performance and health of nursery pigs. Our initial study compared three different waters of varying quality (“good” to “poor”) in a nursery barn with common management, health status of pigs, and source of pigs. Water quality had no influence on pig performance, incidence of sickness, in vivo gut function, blood chemistry, or behavior. A second study focused on cleanliness of water supply lines on performance and gut microbiome of nursery pigs. Old supply lines in use for 20+ years without cleaning were compared to new lines in use for 6 weeks. A common water source was used.

Supply lines had no influence on pig performance and some influence on diversity of gut microbiome of pigs.

Funding: Minnesota Pork Board

Publications:

Lozinski, B. M., B. Frederick, Y. Li, M. Saqui-Salces, G. C. Shurson, P. E. Urriola, M. L. Wilson, and L. J. Johnston. 2022. Effects of water quality on growth performance and health of nursery pigs. *Transl. Anim. Sci.* 6. <https://doi.org/10.1093/tas/txac002>

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Relationship between disinfection of the farrowing environment and microbiome composition of progeny from birth to weaning

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The central question in this project is: How does the microbial community of the farrowing environment affect establishment of the piglet's microbiome? In this project, we compared a power-washed and disinfected farrowing room with a mirror-image room that was only power-washed. We monitored the environmental microbiome in both rooms and the microbiomes of sows and piglets. We learned that disinfecting the environment had minimal effects on the sows' microbiomes. However, microbiomes of piglets were less diverse than those of piglets in the room without disinfection. Presumably, a more diverse microbiome would make pigs more robust to disease but this hypothesis was not tested. We plan to test this hypothesis in upcoming studies.

Funding: Internal Univ. of MN funds

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Law, K., B. Lozinski, I. Torres, S. Davison, A. Hilbrands, E. Nelson, J. Parra-Suescun, L. Johnston, and A. Gomez. 2021. Disinfection of maternal environments is associated with piglet microbiome composition from birth to weaning. *Amer. Soc. Microbiol. mSphere* 6:e00663-21. <https://doi.org/10.1128/mSphere.00663-21>

Sustainability of feeding systems

PI's: Shurson, Urriola, et al.

This overarching project aims at understanding the sustainability of swine feeding programs related to life cycle analysis from many different aspects. Numerous indicators of sustainability are evaluated including the transmission of foreign animal diseases through feed ingredients, feeds and feed supply chains.

Funding: Internal funds, commodity funds

Publications:

Shurson, G. C. 2020. “What a Waste”—Can We Improve Sustainability of Food Animal Production Systems by Recycling Food Waste Streams into Animal Feed in an Era of Health, Climate, and Economic Crises? *Sustainability* 12(17), 7071.

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Education/Demonstration Projects

SowBridge

PI's: Schieck, Johnston, et al.

Short monthly programs (30 min + Q&A) are delivered over the noon period via Zoom. The program has grown to include fifteen collaborating institutions: MN, IA, SD, NE, OH, IN, IL, KS, NC, WY, PA, TX, ND, MO, and MI. The program for 2022 is underway and the program for 2023 is under development. The 2022 series is the fourteenth edition of SowBridge.

PQAPlus and TQA Producer Training

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BEET Trailer

PI's: Schuft and Schieck

The avian flu outbreak a couple years ago prompted the U of MN Poultry Extension group to develop a BEET Trailer as an educational tool for turkey producers. BEET stands for Biosecure Entry Education Trailer. This trailer is modeled after the ventilation demonstration trailer developed by Brumm, Harmon, Jacobson and others. Sarah Schieck has used the BEET trailer to demonstrate biosecurity practices on hog farms at various conferences, workshops and on-farm trainings.

Personnel/Facility Update

Faculty positions

Swine faculty at the University of Minnesota in the College of Ag continue at a steady level over the past few years. Swine faculty include: Johnston (Nutrition/Mgt; Anim. Sci.), Urriola (Nutrition; Anim. Sci.), Shurson (Nutrition; Anim. Sci.), Baidoo (Nutrition; Anim. Sci.), Li (Welfare; Anim. Sci.), Lazarus (Economics; Applied Economics), Gomez (Microbiome; Anim. Sci.), Saqui-Salces (Gut physiology; Anim. Sci.), Cortus (Housing; Biosystems Engineering), Wilson (Manure mgt.; Soils), Chen (Metabolomics; Food Sci.), and others with passing involvement.

New positions

The Department of Animal Science currently is searching for two faculty positions at the Assistant Professor level in beef: 1. Beef Production Systems and 2. Ruminant Nutrition & Management – Beef. Links for these positions are presented below.

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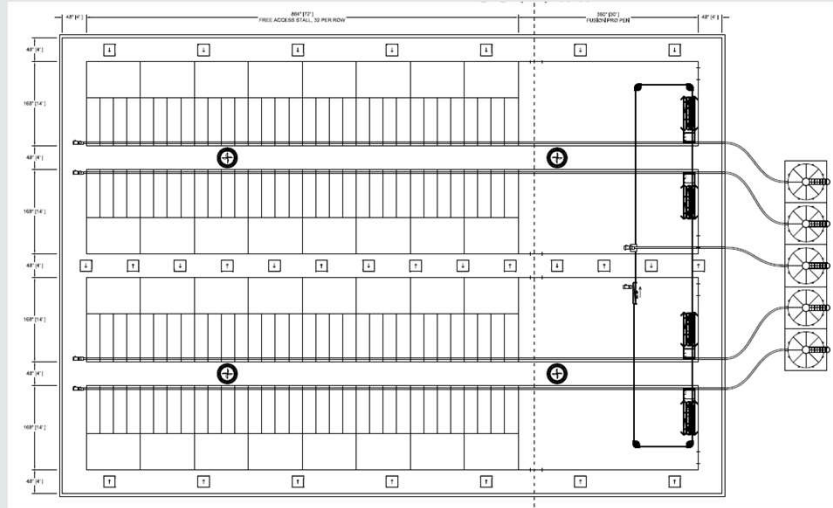


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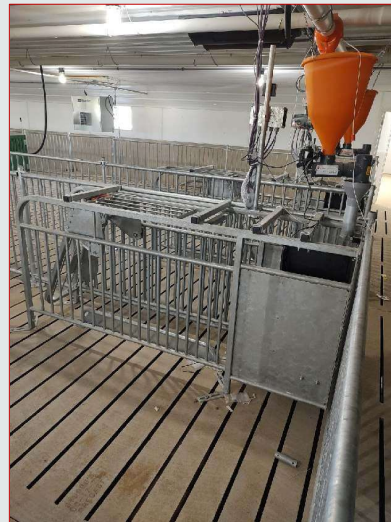
2

New Grouped-Sow Housing



3

New Grouped-Sow Housing



4

New Dairy Farm by 2025-26



5

Swine Campus Faculty

- Adam Moeser, Professor, Matilda R. Wilson Endowed Chair, Large Animal Clinical Sciences
- Madonna Benjamin, Associate Professor and Swine Extension Veterinarian, Large Animal Clinical Sciences
- Cathy Ernst, Professor and Chairperson Department of Animal Science
 - Stress and resilience in pig populations
- Janice Siegford, Professor, Associate Chair for Graduate Programs and Research, Department of Animal Science
 - Precision livestock farming perceptions of key stakeholders in the swine industry

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Swine Campus Faculty

- Dale Rozeboom, Professor, Associate Chair Stakeholder Relations and Animal Farms, Special Assistant to Deans and Directors University Farms and Service Center
 - Clinical Service Research
 - Beneficial fiber for pigs
 - Ground water impacts with mass mortality management at the soil-surface interface
 - ASFv survival in slurry and compost
 - Association for Interdisciplinary Studies
 - USDA Composting SME

7

Dr. Kwangwook Kim, Assistant Professor, Swine and Comparative Nutrition


- 60% research, 35% teaching and 5% service
- Postdoc University of California Davis
 - Comparative Animal Nutrition & Physiology Laboratory
 - Dr. Yanhong Liu
- Gut health weaned pig research
- 2022 ASAS Young Scholar Award
- 2022 ASAS Midwest Stahly/Peo Outstanding Graduate Student in Swine Nutrition
- Starting January



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Departures

- Juan Steibel, Iowa State University, Department of Animal Science, Professor, Lush Chair for Animal Breeding and Genetics, August 2022



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MSU Extension Pork Work Group

- Emergency Response to Accidents Involving Livestock
 - Tools and resources to help animal control officers and first responders develop their skills
 - [Emergency Response to Accidents Involving Livestock \(msu.edu\)](https://www.msu.edu/emergency-response-to-accidents-involving-livestock)
- Secure Pork Supply Planning
- Management over Medication
- Beth Ferry, Casey Zangaro, David Thompson (Educators)

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