**Minutes**

**Project/Activity Number:** NCCC42 Committee on Swine Nutrition

S-1081 Nutritional Systems for Swine to Increase Reproductive Efficiency

**Project/Activity Title:** Committee on Swine Nutrition

**Period Covered:** May 2023-January 2024

**Date of This Report:** January 29, 2024

**Annual Meeting Date:** January 4-5, 2024

**Meeting Location:** Hybrid (In person and Zoom)

**Day 1 Morning Session: Thursday, January 4, 2024**

**Joint Session (NCCC42 & S-1081)**

**NCCC42 Members in Attendance**:

*Attended in person*: Yanhong Liu ([yahliu@ucdavis.edu](mailto:yahliu@ucdavis.edu)) - UC Davis; Jason Woodworth ([jwoodworth@ksu.edu](mailto:jwoodworth@ksu.edu)) – Kansas State University; Tayo Adedokun (tayo.adedokun@uky.edu ) – University of Kentucky; Laura Greiner (greinerl@iastate.edu) - Iowa State University; Tom Crenshaw (tdcrensh@wisc.edu) - University of Wisconsin; Sung Woo Kim (sungwoo\_kim@ncsu.edu) - North Carolina State University; Young Dal Jang ([youngdal.jang@uga.edu](mailto:youngdal.jang@uga.edu)) – University of Georgia; Amy Petry ([amypetry@missouri.edu](mailto:amypetry@missouri.edu)) - University of Missouri; Kwangwook Kim ([kkim@msu.edu](mailto:kkim@msu.edu)) – Michigan State University

*Attended on Zoom*: Hans Stein ([hstein@illinois.edu](mailto:hstein@illinois.edu)) – University of Illinois.

**NCCC42 Members listed in NIMSS, but not in attendance:** Sam Baidoo ([baido001@umn.edu](mailto:baido001@umn.edu)) -University of Minnesota; Shengfa Liao ([s.liao@msstate.edu](mailto:s.liao@msstate.edu)) - Mississippi State University; Phillip Miller (Pmiller1@unl.edu) - University of Nebraska; Layi Adeola ([ladeola@purdue.edu](mailto:ladeola@purdue.edu)) - Purdue University; Tom E Burkey ([tburkey2@unl.edu](mailto:tburkey2@unl.edu)) – University of Nebraska; Jha, Rajesh ([rjha@hawaii.edu](mailto:rjha@hawaii.edu)) - University of Hawaii

**S-1081 Members in Attendance:**

Robert Dove (crdove@uga.edu) - University of Georgia; Crystal Levesque (crystal.levesque@sdstate.edu) – South Dakota State University; Merlin Lindemann (Merlin.Lindemann@uky.edu) – University of Kentucky); Eric van Heugten (Eric\_vanHeugten@ncsu.edu) – North Carolina State University.

*Attended on Zoom*: Eric Weaver (eric.weaver@sdstate.edu) - South Dakota State University; Lee Chiba (chibale@auburn.edu) – Auburn University; Tsung Cheng Tsai ([ttsai@uark.edu](mailto:ttsai@uark.edu)) – University of Arkansas.

**S-1081 Members listed in NIMSS, but not in attendance:**

Charlie Maxwell (cmaxwell@uark.edu) – University of Arkansas; Mark Estienne (mestienn@vt.edu) - Virginia Polytechnic Institute and State University; Amy Desaulniers ([desaulniers@unl.edu](mailto:desaulniers@unl.edu)) - University of Nebraska

**Committee Officers:**

NCCC-042: Yanhong Liu, Chair; Laura Greiner, Vice Chair; Young Dal Jang, Secretary

S-1081: Eric van Heugten, Chair; Mark Estienne, Vice Chair; Tsung Cheng Tsai, Secretary

**Guests:** Dr. Robert Godfrey (USDA-NIFA; in person), Dr. Steve Moeller (USDA-ARS; zoom), Dr. Chris Hostetler (National Pork Board; Zoom), Dr. Jason Frank (AFIA; in person); Dr. Chad Risley (IFEEDER; in person)

**Administrative Advisors in Attendance**: Dr. Jane Schuh (Administrative Advisor, NCCC-042; in person), Dr. James Matthews (Administrative Advisor, S-1081; in person)

**Introduction of officers, committee members, and guests:**

The meeting was declared open at **8:05 AM (EST)** by Yanhong Liu (Chair) with the introduction of the officers and administrative advisors.

**Comments from Administrative Advisors (8:15 AM):**

***Dr. Jane Schuh for NCCC-042 (Kansas State University, in person)***

The administrative advisor Dr. Jane Schuh expressed her appreciation for the opportunity to join the committee and meet with the group in person this year as the administrative advisor. Jane is the Director of Agricultural Research at Kansas State University’s College of Agriculture. This marks Jane’s first year serving as the administrative advisor. She emphasized the importance of the group for collaborative work and is looking forward to learning with this good group. She also encouraged the group to reach out to her with any questions.

***Dr. James Mathews for S-1081 (University of Kentucky, in person)***

Dr. Jamie Matthews appreciated the opportunity to meet with the group in person as an administrative advisor. He is a nutritional physiologist at the University of Kentucky and appreciated the efforts of S-1081. He updated the current situation regarding a new building for Animal and Food Sciences at the University of Kentucky. He also noted that the new proposal for the S-1081 committee has been approved, and the committee is ready for another great five years. He is looking forward to new projects in the S-1081 committee.

In addition (9:22 AM), Yanhong Liu updated the status of the new NCCC-042 committee proposal since it was submitted to the system in December, 2023 and the committee is waiting for the comments. The committee is not sure when to receive the comments. Yanhong highlighted the major changes in the new proposal, in which the statement regarding sow research in the objectives had been removed, and the importance of collaborative research and training graduate students as future generations.

**Program Updates: NIFA: Dr. Robert Godfrey (in person):**

At 8:27 AM, Dr. Robert Godfrey (in person) gave an update on NIFA.

***News and personnel updates from NIFA*** (<https://nifa.usda.gov/newsroom>)

1. NIFA has now ~350 employees and is fully staffed.
2. Dr. Manjit Misra was appointed NIFA Director effective May 8, 2023. Dr. Misra comes to NIFA from Iowa State University, where he was Professor of Agricultural and Biosystems Engineering and served for more than 30 years as Director of the university’s Seed Science Center.
3. Dr. Dionne Toombs has transitioned into her permanent role as Associate Director for Programs from her previous role as NIFA Acting Director, in which she served since April 2022.
4. Dr. Frank Siewerdt, National Program Leader, departed NIFA on April 21 to become Chair of the Department of Poultry Science at North Carolina State University.
5. Dr. Debora Hamernik retired from NIFA effective August 30. Dr. Venu “Kal” Kalavacharla is now serving as acting Deputy Director of the Institute of Food Production and Sustainability.

***NIFA Budget***

For FY2024, NIFA is operating under a Continuing Resolution that funds the relevant portion of the Federal Government through January 19. In FY2023, NIFA received just over $1.708 billion in discretionary appropriations. This was an increase of $48 million above the FY2022 enacted level and $115 million below the FY2023 President’s Budget. Mandatory funding was $231 million, which was $26 million above the FY2022 enacted level. NIFA’s budget information is available to the public athttps://nifa.usda.gov/budget.

Three AFRI Requests for Applications (RFAs) were released for FY2023. See <https://nifa.usda.gov/afrirequest-applications>: 1. The Sustainable Agricultural Systems RFA (AFRI-SAS) was published on February 21, 2023. The deadline for the mandatory LOI was April 13, 2023, and for full applications, was July 13, 2023. Funding of $75-80 million will be allocated to the program, with 8-9 awards expected to be made. 2. The Foundational and Applied Science RFA (AFRI-FAS) was published on February 7, 2023. There are multiple deadlines for applications, depending on the program area. 3. The Education and Workforce Development RFA (AFRI-EWD) was published on May 2, 2023.

Program contacts for Animal Nutrition, Growth, and Lactation are Steve Smith and Mark Mirando. Contact information in the handout has been emailed by Dr. Robert Godfrey on 12/20/23. Please feel free to contact the National Program Leader for questions on RFA, proposal submission, or anything else. Robert encouraged the committee members to serve on the panel, as expertise is needed for proposal review. If interested, contact the National Program Leader, as it is good for them to know there are experts as potential reviewers for grant applications. Yanhong asked a question about the eligibility for the review panel. If you submitted a proposal this year, the individual can’t serve on the panel, but an individual with an ongoing grant can.

**Program Updates: ARS: Dr. Steven Moeller (via zoom; 8:41 AM):**

Dr. Steven Moeller started updated research at the USDA-ARS after appreciating the invitation to the meeting. He introduced the Food Animal Production program and leaders with 600 projects that are currently active. The budget for the USDA-ARS is $1.7 B in FY 2023 for 4 areas (Animal Production Protection, Nutrition, Food Safety and Quality, Crop Production and Protection, and Natural Resources and Sustainable Ag Systems). Dr. Steve Kappes, Associate Administrator, has retired (Dec. 23). He introduced the major research centers for dairy (WI/MA), beef cattle (OK/TX/UT/CO/WY), poultry (GA), and swine (IA) and highlighted the swine research locations and their research focus in NP101 (Food Animal Production) under Animal Production and Protection in ARS, with research priorities in genome editing, reproductive and nutritional efficiency, animal welfare, and meat quality. There are the Agroecosystems Management Research Unit in Ames, IA, for nutrition and animal productivity research; US MARC in Clay Center, NE, with a Livestock Biosystem Research Unit for lifetime productivity and precision management; Genetics and Animal Breeding for gene-edited animals; Meat Safety and Quality Research Unit; Nutrition, Growth, and Physiology Research Unit; Livestock Issues Research Unit in Lubbock, TX; Livestock Behavior Research Unit in W. Lafayette, IN; Plant Genetics Research Unit in Columbia, MO; and National Animal Germplasm Program in Fort Collins, CO. He noted that there are some positions opened (Sung Woo Kim’s question), and the USDA is open to research collaboration (Tom Crenshaw, Amy Petry, and Hans Stein’s question).

**Station reports following this order (9:30AM)**

1. Sung Woo Kim/Eric van Heugten (in person)
2. Tom Crenshaw (in person)
3. Crystal Levesque (in person)/Eric Weaver (on zoom)
4. Jason Woodworth (in person)
5. Lee Chiba (on zoom)
6. Hans Stein (on zoom)
7. Tsung Cheng Tsai (on zoom)
8. Merlin Lindemann/Tayo Adedokun (in person)
9. Amy Petry (in person)

**Break (10:10-10:36 AM)**

**Break-out Sessions**

**NCCC42 (10:36 AM)**

**Review agenda (10:36 AM):**

The committee updated the status of committee members. Rajesh Jha may not join the new proposal period.

**Update on the NCCC42 proposal renewal (10:41 AM):**

Yanhong updated the status of the new proposal, as it was submitted in December 2023. Yanhong will send out the final version of the proposal to the committee members. Laura Greiner suggested that the committee would need more focused research and gather funds together to support cooperative research, and Tom Crenshaw and Jason Woodworth agreed. The group discussed potential funding opportunities for cooperative research, and Jane agreed and encouraged the group to check out the opportunity. Amy Petry and Yanhong Liu shared ideas about funding opportunities.

The group discussed more frequent meetings and future research topics to address issues that the industry currently faces, and the committee can contribute to the industry to solve the issues. Jason Woodworth emphasized the importance of research ideas, and Yanhong suggested the removal of past completed projects and the addition of new projects.

**Review and approve minutes of the 2023 minutes (11:05 AM):**

The minutes of the 2023 meeting were brought up by Yanhong Liu. No changes were made. Sung Woo Kim moved, and Amy Petry seconded a motion to accept the minutes of the 2023 meeting, followed by a unanimous vote to accept the minutes as written.

**Research Discussion. Update, review, planning, execution, and publications (11:10 AM)**

***Review of past projects:***

**1. Bakery meal energy and amino acid digestibility in weanling pigs (Hans).** Hans Stein shared 3 papers published regarding bakery meals and Ca survey. Hans Stein reported that the work has been done and published. The project found the variability of bakery meals.

**2. Calcium and phosphorus (Hans).** Hans Stein reported that the work has been published. Tom Crenshaw commented about the development of rapid analysis of Ca in the feed, as feed analysis for Ca needs to be analyzed before formulation. Hans agreed with the idea. Jason Frank appreciated the good work. The group also discussed the Ca level in soybean meals, which varies among sources. Jason Woodworth suggested a potential project regarding the Ca survey for other bean meals and DDGS Ca. Hans emphasized the dissemination of the results via other publications such as the National Hog Farmer, Feedstuffs, and Podcast, and the group discussed how to advertise our findings from the committee’s research.

**3. Microbiome and protein source in weanling pigs (Phil).** Phil did not attend the meeting. Yanhong updated the preliminary results on behalf of Phil. The fecal microbiome from 8 universities showed variations in alpha- and beta-diversity. The samples have been collected and are being analyzed now. More results can be shared at next year’s meeting.

**4. Phytase super-dosing (Marcia).** Marcia did not attend the meetings. Tom Crenshaw updated the project status and suggested that the results may be outdated, and the group may not discuss this project anymore. There is an abstract that was presented at a National Animal Science meeting. The committee that was present discussed that this project does not appear to be making progress and will need to be terminated.

**5. Intestinal integrity model (Ryan and Yanhong).** Yanhong updated the results, and Kwangwook Kim was also involved in the project. Ryan Dilger did most of the work, but he would not join the committee anymore. Yanhong will talk to Ryan if any data can be shared to the committee next year.

**6. Digestible Ca requirement (Layi).** Layi was not present to present the progress on this project. No update was provided.

**7. Cecal microbiome and energy contribution (Tom Burkey).** Tom was not present to update the committee on the progress of the cecal microbiome study, and no update was submitted to the committee ahead of time.

***Discussion of new projects (11:30 AM):***

**1. Evaluation of reduced energy diets on the growth performance of grow-finish pigs (Brian Kerr and Jason Woodworth).** Jason Woodworth updated the status, and Laura Greiner contacted Brian Kerr and shared the latest version of the formulation for the project.

2. The group discussed potential projects including mycotoxin and soybean meal survey.

**S-1081 (1/4/2024 10:30 AM)**

**Review and approve minutes of the 2023 minutes (10:35 AM):**

The break-out session started at 10:30 am. The agenda and minutes from the previous year’s meeting were noted with no revisions.

**Research review and discussion:**

***Past/current projects (10:42 AM):***

* + 1. **Copper supplementation (Merlin):** all performance data is compiled. Merlin intends to work on paper for submission. Also have milk composition (proximate and fatty acid) data that could be compiled into another paper.
    2. **Essential oils (Merlin):** Merlin to work on getting data into manuscript. This is the end of work on this objective.
    3. **Boron (Merlin and Tsung Cheng):** Merlin obtained data that suggests no beneficial responses were observed when supplementing Boron in sow diets. Due to the lack of response, Tsungcheng suggests dedicating the effort to other projects rather than continuing to investigate Boron’s effect for now. Merlin will move forward on manuscript preparation with their data.
    4. **Phase feeding (Crystal):** manuscript preparation.

***New projects (11:35 AM):***

1. **Phytogenic feed additives (Merlin and Tsung Cheng):** essential oil work at UK can combine with sensory additives work at AR. Whether or not to repeat the UK’s work at AR will be further discussed.
2. **Supplement Histidine (Robert, Crystal, and Tsung Cheng):** Robert noted that UGA is undergoing some changes at their research station and can’t conduct sow research at the present time. Crystal and Tsung Cheng indicate their stations can start generating research data. Robert will share the protocol with participating stations. Briefly, sows will be allotted to their treatments at d 110 of gestation. Colostrum will be collected at farrowing, and milk will be collected during the lactation. In addition to milk, the collection of other biomarkers was considered, including immunocrit and cortisol. Crystal noted that the higher cortisol level shortened the birth duration. Cortisol levels differentiated between large litter with a low body mass of each piglet and smaller litter with a high body mass even though both types of litter had similar total protein mass.
3. **Iron (Crystal):** Crystal noted that SDSU collected blood samples at various stages of gestation and post-farrowing in a cohort of gilts that were tracked across 2 – 3 successive parities and found that hemoglobin level fluctuated during the gestation and declined during lactation in all parities; however, recovery of Hb levels by d 30 of the subsequent cycle declined with parity. Results were submitted to the coming 2024 Midwest ASAS meeting. This can potentially explain the variation from the iron injection study, and it would be interesting to visit further on maternal iron status and its correlation with progeny’s hemoglobin content.

***Other collaborative projects (11:55 AM):***

Iron injection: The paper was modified, reviewed by all coauthors, and was returned to the Applied Animal Science journal on 1/14.

The break-out meeting was adjourned by 12 am.

**Lunch break (12:05-1:05 PM)**

**Afternoon Session**

**Joint Session (NCCC42 & S-1081)**

Yanhong Liu declared the meeting open at 1:05 PM.

**Guest Presentation:** Chris Hostetler, National Pork Board update (**1:07 PM**)

Chris Hostetler provided an update of the NPB with six research priorities for 2024 (Pork Checkoff): – Foreign Animal Disease/ASF, Sustainability/We Care, Real Prop Trust and Image, Nutrition, Domestic Market Development, and International Market Development and introduced team members. The members work for foreign animal disease, sustainability, mental health of farm workers, farm safety, Pro 12, etc. Chris noted that the researchers can send their ideas to NPB, and the research portfolio team can review them for funding. The Real Pork Scholar accepts applications, and students submit the application. Chris shared the results regarding LCA among the US and six international competitors (Brazil, Mexico, Chile, Spain, Canada, and the Netherlands), and the US performs well. The human nutrition team is doing work to increase the role of pork in a healthy diet. Laura Greiner is leading the consortium for nutrient utilization. There were discussions regarding the potential interaction between the committee and the NPB, the need for some reference diet formulations for all phases of production with LCA information, and the importance of NRC requirement revision.

**Internal Speaker:** Merlin Lindemann,update on the National Animal Nutrition Program(**1:40 PM**)

Merlin Lindemann gave a presentation about the National Animal Nutrition Program. The NANP has been established since 2010 to gather all information regarding nutrient requirements, modeling, terminology, etc. across all species as, for example, the swine NRC (1944, 1st ed) had 11 nutrients, but the current NRC (2012, 11th ed) has 36 nutrients, and there have been concerns about the ability to continue to update the NRCs, developing ingredient databases, and updating models. This has been discussed in the committee meetings as well. In 2010, a NRSP (National Research Support Project) proposal was submitted to create the NANP by Charlotte Kirk-Baer, Gary Cromwell, and Nancy Cox, and the proposal focused on supporting nutrition researchers and NRC projects with two working committees (feed composition and modeling) and a coordinating committee. This was approved as NRSP-9 and is now commonly called NANP. The Feed Composition Committee works on a nutrient composition database that the nutritionists can use for upcoming revisions if desired. An example of the need for a common database is that the corn listed in the NRC for beef cattle, dairy, poultry, and swine has a different nutrient profile across the species NRCs. The modeling committee updates and develops models and tools for nutrition research and the NRCs. There are Summits conducted by NANP in every 5-year funding period regarding some aspect of animal nutrition; the Summit topics have been: animal nutrition and a healthy society in 2015, animal protein in the human diet in 2019, and sustainable diets and climate change in 2023. Merlin Lindemann showed the website and how to find the information via the website and shared about the future of NANP, where the program is looking to recruit additional funding opportunities and members for the climate-smart feed management committee.

**Guest presentation**: Dr. Jason Frank, update on the American Feed Industry Association (AFIA) (2:20 PM)

Jason Frank introduced himself, and he is in his second year of AFIA. He updated the AFIA and shared industry feedback in key areas with research. He introduced the missions of AFIA and their values for feed as safe, nutritious food for animals, as a voice for the animal food industry, and providing expert legislative and regulatory leadership and representation. There are 13 defined committees, and Jason Frank is on the nutrition committee. Feed consumption for hogs is 61.8 million tons (2nd following beef cattle), and corn, soybean meal, and DDGS are the top 3 feed ingredients consumed, followed by wheat products and corn gluten feed/meal. Pet food uses whole grains, chicken, meat and bone meal, corn gluten meal, and soybean meal the most. The feed industry supports agriculture and economy by $267.1B total sales, $55B labor income, and 760 K jobs. CA, MO, TX, IA, and KS are the top 5 states in animal food manufacturing, and TX, IA, MN, WI, and PA are the top 5 states with the most feed mills in 2022. The feed industry has a multiplier effect as transportation, financial institutions, etc. are supported by the feed industry. The total US animal food export was $7.4 billion and continues to grow, with the most growth coming from pet food. China is the number one export market to the US. Policy priorities are in the 6 key buckets, including business climate, sustainability, cost effectiveness, feed and food safety, health safety, environment, global market access competitiveness—how the animal feed industry and production are for climate and sustainability, PFAS/PFOS (formaldehyde) for impacts on the animal food industry and influence, non-nutritional label claims, etc. There are many educational programs: AFIA/KSU online feed management course (5x/yr), IPPE pet food conference, feed education, feed your ESG, USDA-APHIS dialogue and digest, and liquid feed symposia. The academic membership is available at no cost to the group, and if interested, please contact Sarah Novak at Snovak@afia.org.

Jason also shared the US Swine Industry Research Feedback from AFIA membership. 1. Sows and Gilts: Sow Mortality is the No. 1 issue, followed by nutrient requirements during lactation, energy and amino acids, the upper limit of synthetic lysine in gestation, prolapse, lameness, and gilt development for longevity and lifetime performance. 2. Grow-Finish (#2a): Late finishing feed conversion and gain with less fat, higher fiber ingredients, optimum formulation, residual feed intake, and soybean meal in the diets, 3. Nursery (#2b): starter pig diet formulation strategy, livability – E.coli, strep, getting started on feed sooner, full-value pigs at market, mortality, and 4. Ingredients (3): soybean meal, coproducts/low-oil DDGS, updated nutrient profiles, loading values in formulation, enzymes other than phytase, and natural products to support health.

**Guest presentations:** Dr. Chad Risley, Do you know IFEEDER? (**3:10 PM**)

Chad Risley introduced IFEEDER for feed education and research as a 501(c)(3) public charity. 100% of donations are used to support IFEEDER projects. The mission is to advance understanding and trust in a sustainable animal feed and pet food supply chain through timely research and education. 5 staff members, 12 AFIA members on the Board of Trustees, and 2 committees for education, engagement, and research work. Scholarships are provided by the Equipment Manufacturers Committee. The IFEEDER helped establish the CLEAR (Clarity and Leadership for Environmental Awareness and Research) center at UC-Davis. The IFEEDER’s current research initiatives are focused on: evaluating feed additives and ingredients for mitigating the carbon footprint of U.S. dairy herds; Reducing biosecurity risks at feed mills in the event of an African swine fever (ASF) outbreak on U.S. soil, and Advancing sustainability research that will deliver a fuller, more accurate picture of the environmental footprint of feed production throughout its life cycle, A Systems Approach to Understanding the Nutrient Cycle Across the Pork Ecosystem, Developing the 12th Edition of the Nutrition Requirements of Swine Report, etc.

**Short break (3:22 to 3:45 PM):**

**Research station update (cont’d; 3:45 PM – 4:01 PM):**

1. Kwangwook Kim (in person)
2. Robert Dove/Young Dal Jang (in person)
3. Laura Greiner (in person)
4. Yanhong Liu (in person)

**Status of current committee members/new members and open discussion (4:01 PM):**

The group discussed any potential new members, and Jane can send them an invitation. Potential members suggested are Ohio State University (Sheila Jacoby), University of Minnesota, Texas A&M University, Prairie Swine Center, University of Guelph (Lee-Ann Huber), University of Manitoba (Chengbo Yang), University of Alberta (Ruurd Zijlstra), USDA (Jay Johnson, Sarah Pierce, Lea Rempel, and Nicole Sanchez), and Penn State University (Elizabeth Hines).

Open discussion – There were discussions about public relation engagement with NPB and the changes in NPB funding. Undergraduate research funds are from the US Pork Center of Excellence. The NPB’s 2024 estimated budget is $73 million.

**Discussion of next year’s meeting place and date (4:30 PM):**

The date and location were discussed, and the committee agreed that the current location (Nashville) is good. The location needs to be a larger airline hub for convenient travel and should have no/minimal issue with snow in January. Orlando had been cheap for travel and hotels but now became busy in early January. Atlanta may have high hotel prices. Tom Crenshaw moved a motion for the meeting dates on January 6th and 7th, and the amendment was made to January 7th and 8th. The group voted for both options (6th–7th: 7 votes; 7–8th: 1 vote). Crystal Levesque emphasized the need for a semi-permanent meeting place. There were discussions about the same-day travel with the afternoon meeting and the half-day meeting on the second day, but there were opinions about keeping the same format. The final motion was with the regular meeting time on 6th–7th and travel on 5th with the location at Nashville by Amy Petry, and it was seconded by Yanhong with 10 votes (in person) and 2 votes (on Zoom). Opposition: 1 vote. Motion carried.

The meeting was adjourned at 5:00 PM.

**Day 2 Morning Session: Friday, January 5, 2023**

**Breakout sessions**

**NCCC42**

**Committee Business meeting (8:05 AM)**

A. Election of officers for the next year (Discuss the roles of officers).

* Kwangwook Kim was nominated for the position of secretary. This was moved and seconded. A unanimous vote followed. Yanhong Liu explained the responsibility of officers.
* Chair: Laura Greiner (moved from vice chair)
* Vice Chair: Young Dal Jang (moved from secretary)
* Secretary: Kwangwook Kim, Tom C. nominated, Sung Woo Kim seconded.

B. Other business

* Sung Woo Kim made a motion to express appreciation for Yanhong Liu’s service as Chair of the committee.
* There were discussions regarding meeting times and formats in the group. Tom Crenshaw commented about the purpose of this meeting and the committee for interaction and connection. Research discussion and building relationships between committee members are great values of this committee meeting, and the group may need more time for research discussion. Young Dal Jang suggested keeping the meeting time as it is and having flexibility. There have been presentations by some stations, and the group discussed the research to help each other. Sung Woo Kim commented that this meeting gathers many people from academia and allows people to know each other and interact together. Amy asked how we could more efficiently run the committee meeting. Laura suggested quarterly virtual meetings in which we can discuss research topics and industry issues such as hybrid mode. The group agreed with some changes in the meeting agenda to have more discussions regarding research topics and outcomes at each station. The group agreed that the committee needs to make more efforts to support students to get them into the industry, as student numbers for swine and poultry may decline. Also, the group agreed that this meeting is helpful for junior faculty members to build networks and collaborate with other stations.
* Sung Woo Kim mentioned that members who could not participate in the committee meeting may need to be contacted for updates. It is important to check the attendance. Laura suggested that we may want to contact all members to remind them of how to re-join the committee and ask for participation, and Laura will communicate with Jane to contact members. The group may collaborate with other researchers and invite them for collaboration.

**Continue and finalize discussions on research plans for the coming year (8:57 AM):**

Jason Woodworth discussed the research plan that was discussed last year: reduced energy with the addition of fiber. The group agreed to keep up with the project and follow up with Brian Kerr for an update.

Jason Woodworth asked about possible research topics that could help the NRC committee. Laura commented that we may need some ingredient analysis regarding carbohydrates (fibers), fatty acids, etc.

Jason Woodworth summarized the discussion, and the group agreed to quarterly meetings for research topic discussion. Laura Greiner will send a poll for the meeting schedule in April, and members will bring some ideas. There was a discussion about vitamin requirements. Vitamin deficiency is hard to create, but Tom Crenshaw commented that a vitamin-deficient sow diet with no vitamin nursery diet may create vitamin deficiency in pigs.

The NCCC42 business meeting concluded at 9:30 AM.

**S-1081**

**Continue discussion on new research objectives (8:00 AM)**

***Sow longevity (8:05 AM):***

In the United States, sow mortality is a major concern in swine production. New genetic lines are selected to increase the number of pigs per year, but the culling rate remained around 50 to 60% after the primiparous cycle. The leading causes of culling are lameness, prolapses, reproductive inefficiency, and death loss. Several factors were discussed in the meeting, including nutrient management during gilt development, body condition/weight entering the gestation, body condition/composition change throughout gestation and lactation, and recovery pace after parturition, contributing to the culling at various degrees. Several nutrient intervention strategies were discussed.

1. **Sodium salicylate SDSU (Eric and Robert):** Eric noted that when gilts were fed sodium salicylate 3 days before farrowing, it reduced savage behavior in gilts. Sodium salicylate is an agonist of PGF2alpha and has an anti-inflammation effect, which might help soothe the gilts during the challenge stage. Sodium salicylate was also found to increase milk yield and milk fat in dairy cattle (Farney et al., 2013), and also reported to tend to reduce preweaning mortality (Muhizi et al., 2022) when fed in lactation. Li et al. (2023) demonstrated that a low dose of sodium salicylate promoted the CYP17A1 expression and modulated the ovulation hormones and inflammation in mice. Therefore, it would be interesting to evaluate the effect of sodium salicylate on sow reproductive performance and longevity. Robert raised concern about the FDA's opinion on utilizing sodium salicylate to promote reproductive performance.

1. **Water quality (assessment of mineral content and total coliform) and intake level (Merlin and Crystal):** Merlin noted that water is a major nutrient, but the level of water consumption and mineral intake from water on reproductive performance is scarce, and the challenge of finding the reference makes it difficult to propose a guideline for swine producers. Crystal noted that the timing of stimulation of water intake on the sow is critical. Failing to increase water intake at the proper stage can have detrimental consequences. Moreover, Merlin noted that sodium salt is commonly used for its electrolyte balance, pH, and nutrient absorption functions and was reported to promote diet and water intake. Unlike the young pigs, which had been reevaluated recently, a current study on salt levels in reproductive sows is missing. Data from young pigs reveals the change in sodium and chloride requirements in new genetic pigs (Shawk et al., 2018; Shawk et al., 2019; Mahan et al., 1996; Mahan et al., 1999). Therefore, it is important to revisit its effect and optimal level in the modern genetic line of the sow. Seynaeve et al. (1996) found that increased sodium chloride to 0.4% increased urine output, shortened the wean to estrus interval, and increased rebreeding rate. The NRC 2012 requirement estimate is 0.15% and 0.20% of sodium while 0.12% and 0.16% of chlorine for the gestation and lactation sow, respectively.
2. **Modeling sow BW change and its correlation to reproduction performance during the reproduction cycle was discussed.**

***Others (9:40 AM):***

1. To evolve the project to investigate responses at the molecular level as a means to identify the biomarkers associated with reproductive performance, and our committee is looking forward to seeking federal funding to support the project. To approach this goal, the team will search for collaboration with molecular geneticists and reproductive physiologists.
2. Merlin noted the costs of manuscript publication. Each member exchanged their thoughts on the time-consuming manuscript reviewing process for journals and whether to involve senior Ph.D. and postdoctoral individuals. This suggests that the journal should consider rewarding the reviewers with a decent publication discount, which could strengthen the reviewers' and the journal’s long-term relationship.

**Business meeting discussion:**

Eric Weaver was nominated and elected for the position of secretary for 2024 with other officers moving up.

Break-out session meeting adjourned: 10:00 am.

**Break 9:30-10:02 AM**

**Joint Session**

**Discuss research projects between the 2 committees (10:02 AM).**

* NCCC42 and S-1081 chairs updated their discussion before break.
* **S-1081:** Eric van Heugten appreciated all committee officers organizing the meeting.
  + Robert Dove updated the histidine project. Jason W. finished a similar project and will share it with the committee. Eric van Heugten or Sung Woo Kim may participate.
  + Crystal Levesque: Sows around farrowing beyond litter size. Temperature or other things that can help sow farrowing. Crystal will develop a specific protocol. Amy Petry and Laura Greiner showed interest in the project.
  + Sensory additive in sows and nursery pigs. The topic has been discussed and will be discussed more later.
  + Second iron injection (Merlin Lindemann): 7 stations participated in the project. The paper has been revised and will be submitted to the journal soon. The answer is that the second iron injection is not universal in terms of growth response improvement in the nursery.
  + Crystal Levesque updated the project for the sow hemoglobin level. Sow hemoglobin level at breeding, d 30, 60, 90, and 112 of gestation, d 2 and 17 postpartum, and piglet hemoglobin level at birth and d 17 of age across 3 parities. The hemoglobin level declines in all parties but more in Parity 2 and 3, with the lowest value at d 17 of lactation. Gilts recovered their level back up to normal within a week, and Parity 2 sows recovered it, but Parity 3 sows couldn’t recover the level back to normal.

* **NCCC42:** Laura updated the discussion. The Ca/P project has been published, gut permeability project published data might be shared to Yanhong by Ryan, and cecal microbiome work with Tom Burkey has no update. Phil updated the microbiome data and found differences among stations.
  + Super-dosing phytase data may be too old, so it is not relevant to the industry. The committee dropped the project.
  + There was a discussion about the project proposed last year by Brian Kerr, but we haven’t gotten into the final decision.
  + The committee will have a quarterly Zoom call to discuss potential research topics. Starting with the next 5-year period, the group will discuss where to go with collaborative research.
  + The format of the committee meeting needs more discussion regarding the research ideas and progress. Crystal asked about the previous format. Hans responded that there are many experts in the room, and it would be worth getting input from the internal members. The internal committee members could update the research.
  + Laura commented that it would be great to have a research discussion to help all members, and more importantly, young faculty members who have no other swine nutritionists available within their station.
  + The NCCC42 committee will update the progress of the plan for quarterly meetings and make some changes to the meeting agenda.

**Decision on next year’s meeting place and date (11:00 AM)**

* The date and location were decided (Jan. 6th–7th) in Nashville. Laura asked about the hotel location, conference room, and food location. Laura will take care of technical issues for the next meeting. Members liked the location, and the Hyatt House provides breakfast. The group may need more time for lunch as the group needs to have lunch outside (11:30 AM to 1:00 PM break).
* Chad Risley appreciated the invitation to join the meeting and will share PowerPoint presentations.
* The final decision was made on January 6th–7th at the Hyatt House (Vanderbilt) in Nashville. The group needs to fill over 75% of the rooms that are booked. Laura has no problem having a contract with ISU, and the vice president chair (Young Dal Jang) will take care of all tasks for arrangement and communication with NPB. A doodle poll will be created to check everyone’s availability.

The meeting was adjourned at 11:20 AM.