

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: January 2021-January 2022
Date of This Report: January 10, 2022
Annual Meeting Date: January 4-5, 2022
Meeting Location: Hybrid (In person and Zoom)

Day 1 Morning Session: Tuesday, January 4, 2022 Joint Session (NCCC42 & S-1081)

NCCC42 Members in Attendance: (10 participants)

Attended in person: Jason Woodworth (jwoodworth@ksu.edu) – Kansas State University; Layi Adeola (ladeola@purdue.edu) - Purdue University; Tayo Adedokun (tayo.adedokun@uky.edu) – University of Kentucky; Laura Greiner (greinerl@iastate.edu) - Iowa State University; Tom E Burkey (tburkey2@unl.edu) – University of Nebraska; Robert Dove (crdove@uga.edu) - University of Georgia

Attended on Zoom: Yanhong Liu (yahliu@ucdavis.edu)-UC Davis; Ryan Dilger (rdilger2@illinois.edu) - University of Illinois; Tom Crenshaw (tdcrensh@wisc.edu) - University of Wisconsin; Sung Woo Kim (sungwoo_kim@ncsu.edu) - North Carolina State University.

NCCC42 Members listed in NIMSS, but not in attendance: Hans Stein (hstein@illinois.edu) – University of Illinois; Sam Baidoo-University of Minnesota; Brian Kerr (Brian.Kerr@usda.gov)- USDA; Shengfa Liao (s.liao@msstate.edu) - Mississippi State University; Phillip Miller (Pmiller1@unl.edu) - University of Nebraska.

S-1081 Members in Attendance:

Robert Dove (crdove@uga.edu) - University of Georgia; Charlie Maxwell (cmaxwell@uark.edu) – University of Arkansas; Crystal Levesque (crystal.levesque@sdsu.edu) – South Dakota State University; Joel Brendemuhl (brendj@ufl.edu) – University of Florida; Merlin Lindemann (Merlin.Lindemann@uky.edu) – University of Kentucky; Eric van Heugten (Eric_vanHeugten@ncsu.edu) – North Carolina State University.

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

Lee Chiba (chibale@auburn.edu) – Auburn University; Mark Estienne (mestienn@vt.edu) - Virginia Polytechnic Institute and State University; Jeff Clapper (jeffrey.clapper@sdsu.edu) - South Dakota State University; Eric Weaver (eric.weaver@sdsu.edu) - South Dakota State University; Sherrie Clark (sherrie@vt.edu) - Virginia Polytechnic Institute and State University.

Committee Officers:

NCCC42: Jason Woodworth, Chair; Brian Kerr, Vice Chair; Yanhong Liu, Secretary
S-1081: Robert Dove, Chair; Crystal Levesque, Vice Chair; Eric van Heugten, Secretary

Guests: Dr. Chris Hostetler (National Pork Board, in person), Dr. Tim Sullivan and Dr. Robert Godfrey (USDA-NIFA; called in), Dr. James Matthews (Administrative Advisor, S-1081), in person), Dr. Keith Haydon (CJ America, in person)

Administrative Advisors in Attendance:

Dr. Don Beitz for NCCC42 (Iowa State University, zoom)

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

At 8:10 AM, the Administrative Advisor, Dr. Don Beitz expressed his appreciation for the opportunity to meet with the group again this year. Don is a Distinguished Professor of Animal Nutrition at Iowa State University. This is Don's third year serving as the administrative advisor. He appreciated Jason for organizing this annual meeting and Joel for coordinating the meeting place. He enjoyed reading the strong history of both multistate groups. He had a few comments on both NCCC42 and S-1081. First, doing a great job of facilitating scientific communication among states and universities. Second, the great opportunity that the annual meeting provides to share research across the country, to work together as a strong team, and to increase the outcome of our research. Third, doing a great job of ensuring there is always someone in charge of and organizing the meeting. Fourth, reminder that a new proposal is due on September 30, 2023. Last, the minutes and report should emphasize the collaborative nature of research and be submitted within 60 days of the meeting dates. Don is looking forward to our research report.

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

Dr. Jamie Matthews opened his comments by appreciating the opportunity to serve as administrative advisor to the S-1081 committee. This is his first time serving in this advisory capacity. He echoed the comments made by Dr. Beitz and noted the impressive history of the S-1081 committee in terms of their commitment to collaboration, scientific strength, and impactful outputs. He is a nutritional physiologist at the University of Kentucky and can appreciate the efforts of the S-1081.

NIFA update

At 8:16 AM, Dr. Tim Sullivan (on zoom) gave an update on NIFA. Tim appreciated the hybrid option of this meeting. He is glad to hear all work we done last year.

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

1. NIFA relocated to Kansas City on September 30, 2019 and lost about 75% of its staff. NIFA now has around 250 employees and all mission critical functions have continued.
2. On Jan 4, 2021, Dr. Carrier Castille was appointed as the NIFA Director.
3. Dr. Deb Hamernik was appointed Deputy Director, Institute of Food Production and Sustainability in November 2020. Previously she was Associate Vice Chancellor for Research at the University of Nebraska, Lincoln.
4. Dr. Robert Godfrey joined NIFA in September 2021 as Director, Division of Animal Systems. Previously he was Director of the Agricultural Experiment Station at the University of Virgin Islands, St. Croix. Dr. Godfrey introduced himself and pointed out that he is on the learning curve for NIFA

and USDA. Dr. Frank Siewerdt introduced himself as well and will work with Tim as NCCC42 NIFA representative.

5. National Program Leader News:

- Dr. Andres Cibils (Rangeland Ecology and Grazing Management) joined NIFA in February 2021 after 17 years at New Mexico State University where he was Professor, Department of Animal and Range Sciences.
- Dr. Angelica Van Goor (Animal Genomics and Health) joined NIFA on July 2021 after a postdoctoral fellowship with the ARS in Beltsville, MD.
- Dr. Joel Caton (Ruminant Nutrition and Developmental Programming) joined NIFA in July 2021. Joel is on sabbatical leave from North Dakota State University.
- Dr. Kamilah Grant (Animal Reproduction) joined NIFA in November 2021 after 6 years on the faculty of Alcorn State University and Tuskegee University.

Program Specialists News:

- Cierrah Kassetas joined NIFA in November 2020. Cierrah has a B.S. in Animal Science from New Mexico State University and an M.S. in Animal Science from North Dakota State University.
- Danielle Farley joined NIFA in November 2020. Danielle has an M.A. in Communication Studies focused on Risk and Crisis Communication and Knowledge Management from the University of Montana.
- Beth Krehbiel joined NIFA in December 2020. Beth has a B.S. in Agriculture from Kansas State University and an M.S. in Animal Science from Colorado State University, where she is working on a Ph.D. degree.
- Reikia Salter joined NIFA in January 2021. Reikia has a B.S. in Animal Science from Tuskegee University and an M.S. in Dairy Science from the University of Wisconsin.

NIFA Budget

Congress passed the FY 2021 Omnibus Appropriations Bill that provided a ~3.5% increase in funding for NIFA compared with FY 2020. NIFA awaits passage of FY2022 Agricultural Appropriations Bill. NIFA's comparative budget table will be posted at <https://nifa.usda.gov/budget>.

Three AFRI requests for application (RFAs) will be released for FY 2022. See <https://nifa.usda.gov/afri-request-applications>. 1. Sustainable Agricultural Systems (RFA for FY 2022 is pending). 2. Education and Workforce Development (RFA for FY 2021-2022) will be updated for FY 2022 on Feb 3, 2022. 3. Foundational and Applied Sciences (RFA for FY 2021-2022) was updated for FY 2022 on December 2021. Award size is \$650K for FY 2022.

Program contacts for Animal Nutrition, Growth, and Lactation are Andreas Cibils, Joel Caton, Angelica van Goor, and Steve Smith. Contact information in handout will be passed out by Jason. Please feel free to contact for questions on RFA or anything else.

Station reports following this order (8:27-9:30 AM)

1. Yanhong Liu (on Zoom)
2. Tom Crenshaw (on Zoom)
3. Sung Woo Kim (on zoom), Eric van Heugten (in person)
4. Ryan Dilger (on zoom)
5. Layi Adeola (in person)

6. Charles Maxwell (in person)
7. Crystal Levesque (in person)
8. Merlin Lindemann and Tayo Adedokun (in person)
9. Jason Woodworth (in person)

Break (9:30-10:00 AM)

Break-out Sessions

NCCC42

Review agenda (10:05 AM):

The minutes of 2021 meeting were reviewed and discussed. Layi Adeola moved and Sung Woo Kim seconded a motion to accept the minutes of the 2021 meeting followed by a unanimous vote to accept the minutes as written.

Research discussion (10:05 AM)

Review of past projects:

1. Bakery meal digestibility in weanling pigs (Hans). Ryan reported the project progress. All animal work, laboratory analysis, and data analysis were done. Hans Stein is preparing two draft manuscripts (one for DE and ME data and another for amino acid digestibility) for publication in 2022.

2. Phytase super-dosing (Marcia). Marcia did not attend annual meetings for the last two years. Tom Crenshaw reported instead. The results of this project have been presented in a conference, but no manuscript was generated yet. There are some concerns in statistical analysis and need to be revisited. Jason suggested Tom emails Marcia to get more information. Ryan commented this phytase super-dosing project could be a great contribution to JAS collection. Tom also reported that the shelf life of this phytase was great and stable.

3. Calcium and phosphorus (Hans). Ryan reported the project progress. The manuscript was done. Hans will send the manuscript to the whole committee soon. Jason will contact Hans to check the status of manuscript.

4. Intestinal microbiome (Phil). Tom Burkey reported the project progress. They received all samples from stations, but had issues to get reagents and plates for perform sample analysis. Once they get back to normal, they will process fecal samples as soon as possible.

5. Phytase effect on ileal AA (Layi). Layi reported the project process. The project idea was terminated as contained in the January 2021 meeting minutes. The main issue being identifying enough stations to participate in the study with only Purdue and IL committing at the time.

6. Swine immunology (Anoosh Rakhshandeh). Project was dropped.

Discussion of new projects:

1. Intestinal integrity model (Ryan and Yanhong). Ryan reported the progress. The goal of this project is to develop a simple, reliable, and reproducible assessment protocol for measuring intestinal integrity in pigs using blood samples instead of urine samples. Ryan has completed several pilot studies that determined the: 1. optimal post-dosing time-point for detecting lactulose and mannitol in plasma of healthy young chickens and weaned pigs. 2. 'background' plasma mannitol concentrations in young

chickens. 3. effect of fasting vs. no fasting on plasma mannitol and lactulose/mannitol ratios in chickens. 4. oral dosage of lactulose/mannitol to optimize plasma detection in chickens. Items 2, 3, and 4 will be tested in the following pilot study in 2022 by Ryan's group. A protocol will be generated by Ryan and Yanhong in 2022 and sent to all stations for participation. The goal of this multistate project is to understand the baseline in newly weaned pigs, the variability of different stations, and the impacts of diets (creep feed). Newly weaned pigs at age 21 to 28 days will be used and orally gavaged with dual sugars. Blood samples will be collected at a specific post-dosing time-point for detecting lactulose and mannitol with HPLC by Ryan's group. The following stations signified interest in participating: Nebraska, Purdue, Kentucky, Wisconsin, UC Davis, Illinois, North Carolina State, Iowa State, Kansas State.

2. Digestible Ca requirement (Layi). Layi suggested a study on digestible Ca requirements of 20-kg pigs. Each station is required to contribute a minimum of 4 pens consisting of 2 pens of barrows and 2 pens of gilts for each of 6 dietary concentrations of digestible Ca in a 28-day growth performance study. Limestone and monosodium phosphate will be used as Ca and P sources. Layi will prepare a protocol and send to whole committee for review and decision on dietary formulations. Shipping limestone, monosodium phosphate, premixes of vitamins, minerals, and Se, and soybean meal from a common source will be explored to minimize inter-station variation in dietary Ca concentration. Stations that can harvest bones for DEXA analyses by Tom Crenshaw as done in the past, and or have metabolism crates to conduct Ca and P balance studies on the diets are encouraged, but not required for participation.

3. Cecal microbiome and energy contribution (Tom Burkey). Cecum has great energy contribution in growing pigs. Cecum microbiome picture vs. feces as they relate to dietary fiber and cecal energy contribution is being investigated in Tom's lab. Anyone interested in this preliminary project should feel free to contact Tom for more information.

Sub-committee discussion (11:04 AM)

1. Production (Layi): nothing ongoing
2. Gut health (Phil): nothing ongoing

Update on the archive/past record of committee (11:05 AM, Ryan)

Sally Johnson, the Editor-in-Chief of the Journal of Animal Science (JAS), contacted Ryan to request a special collection/theme from NCCC42 for publication in JAS. The request included 2~3 research articles, 3~5 short communications, 1~2 review articles, and 1 historical communication. The publication charge will be waived. Ryan already received a 400-page collection of meeting minutes that dates back to 1967 from Dr. Gary Cromwell. Ryan will lead the writing of historical communication. Ryan needs all participants to update their publications and multistate collaboration to help his writing. Original deadline is Feb, 2022. Ryan will email Sally to request deadline extension (September 1, 2022, see details in the minutes report below).

So far, NCCC42 could contribute:

- 3 research articles: 2 bakery meals and 1 Ca and P. All manuscripts will be led by Hans. Jason will contact Hans to check if the super-dosing phytase could be another manuscript.
- 3 short communications: 1 for Phytase activity (Tom Crenshaw), 1 for Intestinal permeability (Ryan), and 1 for gut microbiome (Tom Burkey). Ryan commented that short communication will report limited data, only have one table and one figure max, be reviewed by one reviewer within 2-week period. It might be a way to publish data that do not support hypothesis.
- 1 historical review led by Ryan, helped by Tom Crenshaw. Tom commented that the textbook (Swine Nutrition) have great contribution to graduate students' education and academia. This should be

included in the review. What the committee has done in the past to change the industry should be included in the review as well.

- Review article: no volunteer.
Ryan commented that any research related to this committee should be okay for this special collection. Tom Crenshaw commented that short-communications do not need go to the whole committee. Historical communication manuscript and review articles need to be reviewed by the whole committee. Don also commented that he was very happy to listen our discussion. He thanked Ryan for organizing this request and the committee for acting on Sally's request.

Extra discussion (11:38 AM)

- It was noted that Michigan State, Ohio State, South Dakota State, Texas Tech, Texas A&M, Missouri, Louisiana, and Colorado State have no representatives on this committee. Don will reach out to the Agriculture Experiment Station and/or Department Head at each of the respective Universities to recruit new members. He will also reach out to several universities in Canada (Guelph, Quebec, Alberta) to recruit new members.
- Group briefly discussed next year's meeting location and potential dates.

S-1081 Committee

Review of the agenda and minutes started at 10:05 am. Both were accepted and approved as written. A discussion on past and current projects followed.

Past projects

1) Copper project

Three stations contributed to this project (Virginia Tech, University of Arkansas, and University of Kentucky). Data have been collected for sow performance and milk samples. Dr. Lindemann reported data for colostrum and milk composition and mineral and fatty acid composition of tissues. The action plan is to pursue publication of 2 papers, with KY being one paper and the other two stations the second paper.

2) Essential oils (phytogenics)

Kentucky and South Dakota have contributed to this project. This study has been completed and published in abstract form. All data have been collected and the goal is to write this paper up as a manuscript.

K Fuoss, M D Lindemann, C L Levesque. 2018. Effect of essential oil supplementation to lactation diets on reproductive performance and fecal characteristics of sows. J. Anim. Sci. 96(Suppl 2):254(Abstr.). <https://doi.org/10.1093/jas/sky073.471>

3) Organic minerals

All the work associated with this objective has been completed. A manuscript has been published in Translational Animal Science in 2020.

Tsung Tsai, Gary A Apgar, Mark J Estienne, Mark Wilson, Charles V Maxwell. 2020. A cooperative study assessing reproductive performance in sows fed diets supplemented with organic or inorganic sources of trace minerals. Trans. Anim. Sci. 4:59-66. <https://doi.org/10.1093/tas/txz178>.

Current projects

1) Boron

Kentucky has completed 3 parities on this project and has collected data on sow and piglet performance and bone characteristics. Arkansas could potentially start in October and Virginia Tech had expressed

interest, but has not started. Kentucky will go ahead and proceed to summarize the data and work on publishing a manuscript.

2) Phase Feeding

South Dakota is the only station working on this project. Feeding trials have been completed. The subsequent approach has shifted more towards a modeling approach with the intent to focus on basic trials. It appears that bump feeding may not be a good strategy unless energy can be diluted. Feeding trials will be summarized and written up this year.

4) Iron

Improving the iron status of sows was discussed as a potential project.

Lunch break (12:00-1:15 PM)

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

Jason Woodworth declared the meeting open at 1:15 PM.

Guest Presentation: National Pork Board, Chris Hostetler (1:15 PM)

Chris Hostetler provided an update of the NPB. In 2019, NPB restructured their operating plans with two major changes. First, replacing the traditional committees with Task Forces. Task forces have well-defined purpose, objectives, time span and budget. Second, the Pork Checkoff includes a shift to annual planning and proactive engagement. The new annual planning process incorporates industry feedback year-round and is more agile for a fast changing business environment. All US pork producers and allied industry representatives are encouraged to engage at both the state and national levels. The partners in the states do tremendous work and provide additional opportunities for participation. Briefly, NPB hosts regional meetings in June/July, prioritizes sessions in August, assigns budget for coming year based on the need and resources in September. NPB generally knows the budget for coming year around Thanksgivings. There are five priorities: Swine disease prevention, AgView, sustainability, continue engaging with state organizations, international collaboration.

Chris suggests we pay attention to NPB weekly newsletter, which will give us a brief snapshot. For request proposal process, he said there will be no standard proposal request, encourages paying attention to the research website for any update. Different research areas will be posted at different time spots. Research requests will be more responsive to our producers' priority and more flexible. The proposal review timeline includes 6 weeks scientific review and 6 weeks producer review. Chris announced the NPB Pork Scholar Program. This scholar program is not fellowship or scholarship. It is a supportive training program. It was initiated in 2020, repeated in 2021, will continue in 2022. The proposal writing perspective is different as standard RFA. Producers would like to see the collaboration with industry, instead of research. Undergrad scholar opportunities will not be offered anymore.

Guest presentation: American Feed Industry Association (AFIA) – Non-Ruminant Committee: Keith Haydon, CJ America (2:05 PM)

Keith gave a quick regulatory and industry update. GRAS will be used for abbreviating Regulatory Framework for Substances Intended for Use in Human Food or Animal Food on the Basis of Generally

Recognized as Safe (GRAS) Provision of the Federal Food, Drug, and Cosmetic Act: Guidance for Industry). GRAS was published on Aug 17, 2016, Federal register Vol. 91, No. 159. The revised regulatory framework provides more flexibility for supporting the application of GRAS. The new guidance (#262, internal guidance, May 2019) requires all pivotal data in GRAS submission must be published in peer-reviewed journals (i.e., enzymes, plant extracts etc.). Since 2010, the success rate of FDA GRAS application was 30.96%.

Keith also updated AAFCO (The Association of American Feed Control Officials) upcoming Midyear meeting on Jan 18-20 at Mobile, AL. The meeting agenda includes common food index procedures, update AAFCO 36.14 direct-fed microbial, nomenclature of corn gluten meal, and removal of calcium. He also updated the AFIA major priorities, such as, developing sustainability road map for feed industry (LEAP project phase 2, develop global database of feed ingredients) and increasing funding for FDA to speed up FDA approval.

Guest presentation: Overview of CJ and current status of global AA market: Keith Haydon, CJ America (2:22 PM)

Keith summarized the global amino acid market status. The global amino acid market size is expected to increase in 2022. The major inputs for AA fermentation include energy, carbon source, capital cost, and cost to build bio-fermentation plants. Major AAs are mainly used in poultry (44%) and swine (37%). He also reported the global market status of individual amino acids, such as Lysine, Threonine, Methionine, Tryptophan, Valine, Arginine, Isoleucine, and Histidine. The location demand of these major AAs is following the order of China > Europe > South America or North America > East Asia > Australia. Major AA's demand is expected to increase by 4-5% per year. Keith also updated the container freight rates, which increased from \$4,040 at the first quarter of 2020 to \$22,000 on December 2021. The Olympics energy control regulation in China to improve air quality also reduced the production of major AAs. Therefore, AA prices are likely to remain high in 2022.

Keith updated the US domestic AA production. Major companies for AA production are ADM, Ajinomoto, CJ Bio America, Evonik, and Novus (MHA). ADM stopped dry L-Lysine HCl production.

Internal Speaker – Jason Woodworth-Current topics impacting commercial diet formulation (2:55 PM)

Jason gave a presentation on feed and nutrition-update and industry hot topics (www.ksuswine.org). Jason first summarized the comparison of phytase sources. Because of differences in phytase characteristics and variation in recommended levels for similar phosphorus release among products, there is an interest to be able to effectively compare phytase sources. KSU developed a calculating tool (2021 KSU phytase calculator-phytase release table) to provide release estimates for phytase sources based on the estimates of bone mineralization. The conservative release of P will save up to \$2/pig and the aggressive release of P, Ca, NE, AA will save around \$8-10/pig. Understanding the precise release values of P will help producers to save more, as well as to avoid phosphorus deficiency.

Jason introduced K-State feed safety team that implement biosecurity measure in feed mills to minimize the chance of disease transmission via feed. This special measure will improve animal health, economic security, and food safety. He suggested that pelleting temperature above 54°C could be effective in reducing the quantity and infectivity of PEDV in swine feed. He also reported that medium chain fatty acids are also able to prevent PEDV contamination.

Jason also updated on the Improving Pig Survivability project. This project is a five-year, interdisciplinary, multi-university project (Kansas State, Iowa State, and Purdue), funded by NPB and FFAR. The project aimed at reducing mortality in the US swine industry by 1% or more per year of the project. International Conference on Pig Survivability was held in Omaha, NE on Oct. 27 and 28. This conference was the part of the project in order to facilitate the discussion and dissemination of the most current information relative to sow, litter, weaned pig and grow-finish mortality. Subscribe to (<http://piglivability.org>) for project updates.

A potential revision of the 2012 Swine NRC was discussed. Potential support in the amount of \$150k, \$100k, and \$100k from NPB, the corn growers association and the soybean board, respectively, could initiate this revision.

Short break (3:28 to 3:39 PM)

Discussion of next year's meeting place and date (January, 2023) and future meeting administration (3:39 PM)

Joel shared his retirement plans and the need for a new meeting coordinator to take care of registration fee collection, hotel and conference room reservation. He thanked all of participants for helping attain the 80% contractual hotel room reservation target. We used the additional money from the past to insure this year's conference room reservation. He can pass the contact information of hotel to new coordinator if the 2023 meeting is to be held in Orlando. The tricky part is the need to secure AV equipment (bringing our own saves money, but it is possible to rent from the hotel which is very expensive). NCCC42 and S-1081 annual meetings have been in this hotel since 1993/1994. Chris Hostetler offered that the National Pork Board could host the meetings in their Des Moines office if the committees were interested in this option.

After discussion, the new solution is to have the annual meeting in Des Moines, IA, around the middle of May, 2023. NPB (Chris) will host the meeting by coordinating the conference room and hotels. NCCC42 and S-1081 prefer to have joint meeting.

Station reports continue (4:20 PM)

1. Robert Dove (Georgia)
2. Tom Burkey (U Nebraska)
3. Laura Greiner (Iowa state)

Discussion of JAS request for Multistate Project special collection (4:35 PM).

Ryan explained the JAS request to the S-1081 group. Ryan updated that Sally is glad to invite both groups for contribution to this special collection, which will highlight multi-state collaboration. Publication charge with promotion code (NCCC42) is free. The collection from NCCC42 and S-1081 includes: two historical articles, 3-5 short communications, 3-5 research articles, 1-2 review articles (no volunteer yet), deadline September 1, 2022.

Meeting was adjourned at 5:00 PM.

Day 2 Morning Session: Wednesday, January 5, 2022
Breakout sessions

NCCC42

Committee Business meeting (8:05 AM)

A. Election of new officers occurred at 8:05 AM with the following officers unanimously elected for 2022:

- Chair: Brian Kerr (moved from vice chair)
- Vice Chair: Yanhong Liu (moved from secretary)
- Secretary: Laura Greiner, Jason nominated, Tom C. seconded.

B. Other discussion:

Swine Nutrition Textbook update: Tom Crenshaw initiated the discussion of updating NRC Swine or Swine Nutrition Textbook. It might take several year's effort to complete. He asked if this update is necessary or valuable. The last version of Swine Nutrition Textbook was edited by Austin J. Lewis and L. Lee Southern and published in 2001. Tom, Sung Woo, and Jason all commented that this textbook was heavily used for graduate training, but information was old and citation was out of date.

Layi mentioned that another textbook for swine nutrition (Sustainable Swine Nutrition, second version) is very close to being published in 2022. Several committee members in NRC submitted book chapters, including two chapters from Hans and one chapter from Layi. It may not be the right time to update the blue Swine Nutrition book right now. Everyone agreed that we should check the content of Sustainable Swine Nutrition first before taking any further action. The update of Swine Nutrition Textbook will be re-discussed in next year's annual meeting.

The update of NRC Swine will likely start 2023. Sung Woo suggested that we should make a sub-committee with NRC Swine next year to contribute this update. This will be re-discussed in next year's meeting.

More Discussion on New Projects on digestible Ca (Layi). Layi looked back his 2014 notes. There were two sets of diet formulation. In the new protocol, there will be two diets as well. Calcium will come from soybean meal and different Ca supplements which needs to be accounted for in each station. The potential plan is to get soybean meal and premix from Central location and send to different stations. Layi will work on the protocol and send to whole committee in the next few months. Participants: Iowa State, Kansas State, Purdue, NC State, Kentucky, Wisconsin. Tom from Wisconsin can help bone analysis with DEXA scan.

Continue and finalize discussions on research plans for the coming year (8:45 AM)

Jason summarized the new projects: Gut permeability (Ryan and Yanhong), Digestible Ca (Layi), Gut microbiome (Phil)

Other discussions

Layi asked clarification on JAS request, if individual lab can submit research article to this specific collection. Ryan said that Sally is not very excited to collect individual lab's research manuscript. The multistate cooperative work is preferred.

More discussion on place and time of future meetings. NCCC42 business meeting was concluded at 9:10 AM.

S-1081 Committee

The meeting was started at 7:59 am with the election of officers. It was suggested to select Dr. Mark Estienne as incoming secretary and to move Dr. Crystal Levesque from the Vice-Chair position to the Chair and Dr. Eric van Heugten from the Secretary position to Vice Chair. Thus, the election of new officers is:

Chair: Crystal Levesque

Vice-Chair: Eric van Heugten

Secretary: Mark Estienne

Past projects were briefly discussed with the action plan that Merlin will summarize the Cu data and Crystal will work on the essential oil project to draft a short communication.

Potential new projects were discussed. Several ideas were discussed, including drip coolers, flavors to increase intake, sow weight measurements over time, water intake, iron for sows, histidine requirements, transmission of immune cells via milk, K and Mg to manage fecal DM (constipation).

It is our goal to have a new project ready by approximately January, 2023. Our project renewal is due in September, 2023.

Based on our discussion, we proposed the following 3 research aims for the new project:

- 1) Histidine requirements in sows
- 2) Enhancing feed intake in sows
- 3) Biological indicators of sow nutritional status

Break 9:10-10:00 AM

Joint Session

Discuss research projects between the 2 committees (10:00 AM).

- NCCC42 and S-1081 chairs updated their discussion before break.
- NCCC42: Ryan updated the gut permeability project progress (a quick and easy method to analyze gut permeability), please see the meeting notes above for details. Crystal from S-1081 would like to see the protocol as well. Layi updated the idea of another potential new project on digestible Ca. Jason also explained the discussion of updating Swine Nutrition Textbook (blue book). All NCCC42 and S-1081 committee members truly appreciate Joel's 25+ years' effort to coordinate this joint annual meeting in Orlando.
- Projects will be shared between committees as appropriate to solicit participation in various projects.

Decision on next year's meeting place and date (10:20 AM)

- Joel updated Rosen Hotel's status. Rosen central hotel was closed for the whole year. Hotel has fewer people right now compared with past. Hosting meeting in Orlando will help the hotel. Other group is trying to book the same time spot for next year. The potential dates for next year will be Jan. 4 and 5 or Jan. 10 and 11, if we stay in Orlando. Hotel can hold the contract until we make final decision.
- Final decision: meeting will be hosted by NPB in Des Moines. The potential time is the middle of May. A doodle poll will be created to check everyone's availability.
- All participants thanked and applauded Joel for his years of contribution, as well as Chris and NPB for their unwavering support.

10:47 AM: Jason moved that the meeting should be adjourned and the motion was seconded by Layi.