

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 2019-January 2020

Date of This Report: February 5, 2020

Annual Meeting Date: January 7 - 8, 2020

Meeting Location: Rosen Plaza Hotel, 9700 International Drive, Orlando, FL 32819

Meeting Agenda and Minutes

Morning Session: Tuesday, January 7, 2020

Joint Session (NCCC42 & S-1081)

NCCC42 Members in Attendance: Tayo Adedokun (tayo.adedokum@uky.edu) – University of Kentucky; Layi Adeola (ladeola@purdue.edu) - Purdue University; Michael Azain (mazain@uga.edu) - University of Georgia; Scott Carter (scott.carter@okstate.edu) - Oklahoma State University; Ryan Dilger (rdilger2@illinois.edu) - University of Illinois; Marcia Shannon (carlsonm@missouri.edu) University of Missouri; Brian Kerr (Brian.Kerr@usda.gov)- USDA; Shengfa Liao (s.liao@msstate.edu) - Mississippi State University; Hans Stein (hstein@illinois.edu) – University of Illinois; Phillip Miller (Pmiller1@unl.edu) - University of Nebraska; Anoosh Rakhshandeh (anoosh.rakhshandeh@ttu.edu) - Texas Tech University; Jason Woodworth (Jwoodworth@KSU.EDU) – Kansas State University

S-1081 Members in Attendance: Joel Brendemuhl (University of Florida), Lee Chiba (Auburn University), Merlin Lindemann (University of Kentucky), Crystal Levesque (South Dakota State University), Charles Maxwell (University of Arkansas), Eric van Heugten (North Carolina State University)

Committee Officers:

NCCC42: Shengfa Liao, Chair; Tayo Adedokun, Vice Chair; Woyengo Tofuko¹, Secretary
S-1081: Charles Maxwell, Chair; Mark Estienne, Vice Chair; Robert Dove, Secretary

Administrative Advisors: Dr. Don Beitz¹ (Iowa State University; NCCC42) and Dr. Bob Godfrey (University of Virgin Islands; S-1081)

Guests: Chris Hostetler (National Pork Board; called in), Andrea Hanson (Carthage Systems), Jose Soto (Ajinomoto), and Charlotte Kirk-Baer (USDA-NIFA; called in)

¹ Not present at this year's meeting

Day 1 (Jan 7; AM meeting)

The meeting was declared open at 8:01 AM by Shengfa Liao (Chair) with the introduction of the officers, guest speakers, and administrative advisors. An overview of the agenda was presented minutes of 2019 were unanimously adopted. This was followed by self-introduction and introduction of newest member, Jason Woodworth, from Kansas State University.

Guest presentations:

1. Charlotte Kirk-Baer called in and gave an update on NIFA regarding some of the staff challenges resulting from the relocation from Washington DC to Kansas City. She indicated that the \$425m Appropriation Bill that was signed late in Dec 2019 contained an increase of 2.4% for NIFA compared to about 7% increase for funding for Science programs. As a part of the agency's strategic plans, NIFA is currently asking stakeholders for feedback regarding how they have been performing. Despite the shortfall in the number of available staff, all essential activities will occur as scheduled but the release of fund (for awarded projects) may be delayed for between 30 and 60 days. Interested candidates should check USAjobs.gov for job opportunities. She also mentioned that FY2019 success rate was slightly higher than it was in the past (20-25%) and attributed this fewer number of grant applications received. Charlotte indicated that she will be leaving NIFA January 24, 2020, no replacement NIFA representative yet.

Station Reports (8:34 AM)

Some station representatives presented brief reports for calendar year 2019.

8.57 AM

Dr. Robert Godfrey (S-1081 administrator) informed the meeting that Dr. Don Beitz (NCCC42 administrator) could not make it to Orlando for the meeting. He reminded the secretaries that the minutes of 2020 meeting should be uploaded to NIMSS within 60 days of the meeting). He reiterated the importance of including impact statements in the minutes and noted that 'landgrantimpacts.org' provided training (free of charge for multi-state projects) on writing impact statements.

Station Reports (9.00-9.30 AM)

Station reports presentations for year 2019 continued.

Morning session was adjourned for a short coffee break at 9:30 AM.

Breakout Session (10.02 AM)

NCCC42

Shengfa Liao, Chair

The minutes of 2019 meeting were reviewed and discussed. Ryan Dilger moved and Mike Azain seconded a motion to accept the minutes. The minutes were then unanimously adopted.

The following projects were discussed:

1. Phytase super dosing project: Marcia Shannon said that the manuscript has been sent to Tom Crenshaw to check the statistics and she believed everything looked good and ready to be submitted to Journal of Animal Science once she hears back from Tom Crenshaw.
2. Bakery meal project (DE and ME and amino acid digestibility) – Hans Stein reports that the animal work has been completed on both studies and awaiting ileal digesta samples from Minnesota. Hans Stein plans to write two manuscripts (one from the DE and ME data and another from the ileal amino acid digestibility data) from the two studies. The plan is to submit the two manuscripts for publication before the end of 2020.
3. Calcium and phosphorus levels in commercial pig diet project: Hans Stein currently has about 115 samples out of the 200 samples (target). He reminded members of NCCC42 to help in getting more samples (~500g/sample) from commercial feed millers in their state/location.
4. Intestinal microbiome project, Phil Miller apologized for the slow start of the project. He distributed fecal sampling devices to members of NCCC42 for fecal collection from 2 piglets (one male and one female) from each of the two sows. Samples are to be collected immediately at weaning and preferably, from parity 1 (or as close to parity 1 sows as possible). Deadline for sample submission is April 1st, 2020.

Discussion on new projects

1. Swine immunology project, Anoosh Rakhshandeh provided some background information on the proposed study. The proposed study will focus on “optimizing the amino acid requirements for pigs under disease challenge or stress”.

Most of the discussion surrounded the challenge model to be used. The general consensus was to use LPS although some members expressed concerns that after a couple of LPS challenges, the pig may become less responsive. Anoosh Rakhshandeh promised to send to members of the group an updated version of the protocol.

S-1081

The S-1081 session was called to order at 10:00 a.m. by chair Maxwell. Mark Estienne (Virginia Tech) and Robert Dove (Georgia) were absent. Drs. Bob Godfrey (Virgin Islands) and Jose Soto (Ajinomoto) were also in attendance.

Agenda and past minutes were reviewed with no further discussion.

Activities outstanding from previous projects (Cu, phytogenic oil, organic minerals) were discussed. With respect to the Cu supplementation project: data review for accuracy continues. Discussed how best to present the data given differences in measured variables and treatments (3 stations have submitted performance data with 1 station also having milk and tissue mineral levels; 1 station had 2 sources with multiple levels others had source with multiple levels). Intent to submit at least 1 paper within the calendar year. Phytogenic oil studies: there was limited impact on measured performance variables from any station. Merlin will compile the data into a single set for analysis. Organic minerals project: paper was published in Translational Animal Science in 2019.

Ongoing projects were discussed (milk AA composition, boron, phytogenics, phase feeding in gestation). With respect to milk AA composition: Dr. Risley, who attended last year’s meeting, still interested in

analyzing milk for FA profile. Requires only 2 – 3 mL/sample. To date, SDSU and UK have submitted samples to UK for proximate. Merlin will prepare protocol regarding sample collection for milk FA content. Question was posed to Jose whether AA content could be determined on wet milk, given large volume required for sufficient dried sample. SDSU has large freeze dryer that could be used if needed. Questions arose on how to express the AA or FA content (i.e. relative to CP) to determine if the profile is really changing, how to account for dilution effect from a teat with lesser volume. Charlie would check on volume needed for microbial analysis. Boron study: UK intent to put sows on test in gestation and lactation (levels 0, 2, 25 ppm). Can include up to 50 ppm in diets. Will also collect piglet tissue/bones at birth and weaning. Merlin will send out a protocol. Possible stations to contribute females were AR and UK. NCSU will look into availability and logistics of females at Tidewater station. Phytogetic oils: no stations currently intending to conduct study in this area at this time. Phase feeding in gestation: final set of second parity offspring are in finisher barn. AK consider putting females on test. Crystal to provide protocol of treatments.

The session was adjourned at 12:00 p.m.

Afternoon Session: Thursday, January 7, 2020

1.15 pm.

1. Chris Hostetler (National Pork Board, NPB). He gave an update regarding the NPB. According to him, the NPB is undergoing both physical and philosophical changes. The new CEO introduced checkoff 4.0 with the themes: “build trust and add value”. The “build trust” theme involves people and the community while “add value” is built around swine production, marketing, risks, and opportunities. According to him, the 2020 task force includes 6 committees under Science and Technology (animal science falls under this). The task force is different from the standing committees. The US pork producers have lost a portion of their market share in China. Japan is now their #1 trading partner (dollar-wise) while Mexico is their #1 trading partner viewed from the volume of sales. Swine nutrition has been cut from the 2020 budget. However, \$500,000 is approved for nutrient sustainability project. There is a plan to get matching funds to raise the \$500,000 to \$4 m for a multidisciplinary nutrient sustainability study involving animal, plant, and soil scientists. There is also a plan to fund between 12 and 13 graduate students at the rate of \$60,000 (\$30,000/year)/student (~\$800,000/year). Expect this to be a long-term annual program. Emphasis is on graduate training as opposed to a specific experimental project; emphasis on training within cross-disciplinary areas based on industry survey of future employment needs (e.g. animal science + business).

2.15 PM

2. Jose Soto (Ajinomoto) presented a brief history and update on Ajinomoto. Last year, the gross revenue of the company was over \$10b and more than 4% of this was earmarked for research. Out of this revenue, more than 70% came from Japan food products while about 10% came from animal nutrition. North America was the most profitable region in terms of animal nutrition components of the total revenue. Ajinomoto amino acid product lines include L-Lysine, L-Threonine, L-Tryptophan etc. Valine is being produced in Brazil while Isoleucine is produced in France. He presented a couple of published data from their amino acid studies on the effects of high tryptophan and dietary fat levels, oxidative stress and dietary tryptophan level on performance, etc Indicated an expectation for North American production of Val and Ile in near future, likely bringing Arg on line in 2 – 3 yrs.

3.00 PM

3. Andrea Hanson (System Nutritionist at Carthage Systems) gave an overview of what Carthage Systems does. This includes professional swine management, Carthage veterinary services (12 veterinarians), with over 650 employees in production and production services, 31 sow farms in 4 states (IL, MO, KS, and NE). Carthage Systems is one of the top 8 swine producers in the US.

In terms of research, they are interested in economically impactful research. More than 75% of the trials is focused on nutrition and feeding. The four main areas of research focus are i. Genetics; ii. Nutrition; iii. Health; and iv. Facility and Management; with sow development ranking as #1 in priority.

4.00 PM

Station reports continued. This was followed by open discussion at 4.37 PM.

4.53 PM

We deliberated on dates for the 2021 meeting. Joel Brendemuhl informed the meeting that he has been working with the hotel management regarding the 2021 dates and would provide available dates on the following day (Wednesday) for deliberation. Logistics of the Animal Kingdom Nutrition facility tour on Wednesday afternoon were also discussed.

The meeting was adjourned at 5.00 PM by Shengfa Liao.

Wednesday Session (Morning): January 8, 2020

NCCC42

The meeting was called to order by Shengfa Liao at 8:00 AM.

The new member (Jason Woodworth of KSU) was welcomed into the group.

It was announced that Tofuko Woyengo (the current Secretary) is no longer a member of NCCC42, hence there was a need to get a replacement for him. Two new officers are needed as against the usual act of electing one new officer each year. Han Stein nominated Anoosh Rakhshandeh which was seconded by Layi Adeola. Anoosh Rakhshandeh was then unanimously elected as the new Vice Chair. Jason Woodworth was nominated by Layi Adeola for the position of Secretary and this was seconded by Brian Kerr. Jason Woodworth was elected unanimously to the post of Secretary.

We deliberated on the state of archived materials relating to the history of NCCC42. Marcia Shannon indicated that some of the old materials relating to the history of the group could be with some senior members. Ryan Dilger indicated that all of these materials should be preserved. Phil Miller indicated that he probably has a bound copy containing pertinent information about the history of the group. Ryan Dilger requested that such information/document should be sent to him so he could archive it on the NIMSS.

Phil Miller suggested that we consider moving the group from a coordinating committee to a funded project. After series of careful considerations, it was agreed that we should maintain the status quo. If a change to funded project becomes necessary, this can be considered during the next project renewal. However, the majority of the opinions was to remain as a coordinating committee rather than a funded group because almost everyone on the committee also has his/her individual hatch project which is funded. It was concluded that we should remain as a coordinating committee for now.

Shengfa Liao reminded the group that it is important we grow the membership of the committee by reaching out to different institutions such as Michigan State University, Iowa State University, and Ohio State University for members.

We continued discussion on the study proposed by Anoosh Rakhshandeh. Anoosh Rakhshandeh was asked to send a copy of the revised protocol to every member.

The project on “Gut function measurement” proposed by Tom Crenshaw was not discussed as he was absent at the meeting).

New Proposal

Hans Stein proposed conducting a joint study on phytase effect on ileal amino acid digestibility in cannulated pigs. Layi Adeola and Hans Stein were asked to develop a full proposal for the proposed study.

Layi Adeola and Phil Miller apologized for their inability to present any report on the Production and Gut Function sub-committees’ responsibilities assigned to them. Below is the breakdown of people with interest in the two sub-committees:

Production Sub-committee (Chair – Layi Adeola): Mike Azain; Brian Kerr; Scott Carter; Marcia Shannon; Shengfa Liao; Hans Stein; Anoosh Rakhshandeh; Jason Woodworth; Sung Woo Kim; Tayo Adedokun

Gut Health Subcommittee (Chair – Phil Miller): Ryan Dilger; Shengfa Liao; Anoosh Rakhshandeh; Tayo Adedokun

Each of the two sub-committees is expected to meet once a year during any National meeting and report back to the group at the annual meeting in January.

Rajesh Jha (Hawaii station; focusing more on Poultry) and Tofuko Woyengo (SDSU; left SDSU) are no longer members of the NCCC42 group.

Ryan Dilger is working on updating our group’s database. He is requesting for information on abstracts that were presented between 2010 and 2019.

We took a break at 9:37 AM (motion was moved by Brian Kerr and adopted by members of the group).

S-1081

Charles Maxwell called the session to order at 8:00 a.m.

Discussed iron injection study, supplemental study, in particular how to analyze data. Example, consider actual day of age, body weight category, pair-wise comparison within litter vs ANOVA. Merlin reminded all stations that put litters on test to send him diet samples. AR to put a group of sows/litter on test Feb 20. Questions arose regarding iron levels in dirt-raised pigs, can piglet tissue levels be increased by sow gestation feeding of minerals.

Kentucky will put sows on Boron study and present study to NCCC-42 for any other possible station involvement.

Determined new secretary for next year committee and proposed other possible members: Janeen Salek-Johnson (Oklahoma State) was suggested.

Session adjourned at 9:30 a.m.

Day 2 Joint Session

Meeting was declared open at 10:03 AM

The new officers were introduced:

S-1081: Chair: Mark Estienne; V. Chair: Robert Dove; Secretary: Crystal Levesque

NCCC42: Chair: Tayo Adedokun; V. Chair: Anoosh Rakhshandeh; Secretary: Jason Woodworth

The S-1081 group (Merlin Lindemann) shared with NCCC42 the studies S-1081 is working on or planning in the coming months while Hans Stein did the same for the NCCC42 group.

Station reports continued.

Joel Brendemuhl discussed the options we had for the 2021 meeting. Our next joint meeting (NCCC42 and S-1081) will take place on the 5th and 6th of January, 2021 with the arrival date of January 4, 2021. Hotel room will cost \$135/night. Marcia Shannon move the motion for the adoption of the meeting dates and was seconded by Brian Kerr.

Shengfa Liao summarized and presented the key points of the 2020 meeting. Layi Adeola asked members to thank Joel Brendemuhl for all he has been doing to support our meeting over the years. He (Layi Adeola) subsequently moved that the meeting should be adjourned and the motion was seconded by Merlin Lindemann.