

**NE-1942 Annual Meeting:
Enhancing Poultry Production Systems through Emerging Technologies and Husbandry
Practices**

Monday, July 27, 2020

Virtual Meeting

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The meeting was called to order by Tayo Adedokun at 1:00 pm.

Introduction of Participants:

- John Linhoss – Miss State - Biosystems engineering
- Tayo Adedokun - U Kentucky - Poultry nutrition, amino acids, minerals
- Kelley Wamsley - Miss State – Broiler nutrition, feed particle, amino acids
- Janice Siegford - Michigan State – Laying hen alternative housing systems
- Ken Koelkebeck U of Illinois –Laying hens, broilers extension, heat stress, management
- Tony Pescatore – U Kentucky – Poultry nutrition and Mgmt, Extension
- Pratima Adhikari – Miss State – Laying hen nutrition, management, gut health
- Shawna Weimer – U Maryland – Broiler welfare and stress physiology
- Dianna Bourassa – Auburn – Processing food safety and welfare
- Heng Wei Cheng – USDA ARS
- Jorge Vizcarra – Alabama A&M – Poultry as an animal model
- Mary Anne Amalaradjou – U Conn – Food safety, natural antimicrobials
- John Boney – Penn State – Broiler, turkey nutrition and management
- Wei Zhai – Miss State – Poultry nutrition
- Tom Vukina - NC State – Economics, integrator grower relations, welfare
- Anup Johnny – U Minnesota – Food safety
- Mike Persia – Virginia Tech – Broiler, layer, and turkey nutrition
- Yang Zhao – Miss State/U Tenn – Environment, precision livestock farming
- Wilmer Pacheco – Auburn – Feed processing and broiler nutrition
- Wei Zhai – Miss State – Nutrition and gut health
- Ken Anderson – NC State – Laying hens, eggs
- Lingjuan Li – NC State – Environmental control, ag engineering
- Daniel Chesser – Miss State – Ag engineering housing design, energy efficiency
- Indu Upadhaya – U Conn – Food safety
- Paul Patterson – Penn State – Laying hens, nutrition, nutrient management
- Rajesh Jha – U Hawaii - Poultry nutrition and gut health
- Sally Noll – U Minnesota – Turkey management and nutrition

Welcome Address

Dr. Robert Houtz - Associate Dean for Research and Director of the Kentucky Agricultural Experiment Station, University of Kentucky

Tayo Adedokun: NE-1942 has 51 members comprised of 25 universities, 3 USDA-ARS, and 1 international partner with variable poultry interests.

Robert Houtz: Poultry is the number one agriculture industry in Kentucky. Although the University of Kentucky will be losing the old poultry facilities, new ones at the Woodford county location should be completed in the summer of 2021.

Tony Pescatore: What do you hear from other research directors across the country on what we can expect in the next year in terms of finances and COVID-19?

Robert Houtz: There's a 380 million dollar package that's coming out from the USDA to help with reinstating research and extension programs of which 80 million goes to extension and the rest goes to research. Most of that is recognizing the delays that have happened in terms of research programs. Associate directors of research have developed plans at their universities to target graduate students that were within one or two semesters of finishing so that we can help them finish. Some universities are bringing back students to campus with the expectation of finding 300 to 900 students test positive and subjected to quarantine. Spikes in COVID-19 may result in a shift back to online learning. In terms of research, we have about 150 researchers that have filed request to go back to the laboratory or back to field research. That comes with the contingency that if cases spike we will move back to phase one. Many faculty members could be at elevated risk for COVID-19.

Adoption of 2019 Minutes

Rajesh Jha, moved a motion to approve the minutes of the 2019 annual meeting that was held in Honolulu, HI. This was seconded by Mary Anne Amalaradjou. The minutes were approved by unanimous vote.

Administrative Updates

Election of New Officers

Brett Ramirez will be the Sr. Executive for 2021.

Dianna Bourassa offered to cede the position of secretary if another member was interested. Members of the committee unanimously thanked her for her service to our group but encouraged her to continue to serve in this capacity. She gladly accepted.

John Boney was nominated for Jr. Executive for 2021 by Kelley Wamsley. Paul Patterson moved to close nominations. John Boney accepted the nomination. Ken Anderson moved to elect by acclimation. John Boney was unanimously voted in as the Jr. Executive for 2021.

Deliberation for 2021 Meeting Location

Iowa State University was determined to be the preferred location for 2021 on the assumption that we will be able to meet in person. Dates will be in conjunction with the Poultry Science Association meeting to be held July 19-22, 2021 in Omaha, NE. Iowa State as the host will afford members of our group the opportunity to visit the university's new poultry facilities as well as the Egg Industry Center.

Brett Ramirez will be the host at Iowa State and will confirm location availability.

A potential alternative will be Omaha, NE during the PSA annual meeting.

Other Administrative Items

The station reports have been prepared and provided in pdf format. Meeting minutes and associated reports will be uploaded onto NIMSS website. Ken Koelkebeck will be submitting the

report within 60 days. This is the first NE-1942 report for the 5 year time period. Ken Koelkebeck and Rick Rhodes put in a nomination to compete nationally for multistate awards.

Station Reports

Alabama A&M University – Jorge Vizcarra is researching active and inactive forms of ghrelin on broiler chicken appetite and animal behavior. He is also working on a ghrelin agonist in broilers and turkeys finding different effects. A chicken model is being developed to investigate short term memory loss linked with feed restriction. He is working with other multistate members (Bourassa) in submitting grant proposals for this work. Additionally, he is working with feed restriction of chickens and cannabis sativa as alternative feed during restriction.

Auburn University – Bill Dozier is the new department head. There have been several retirements. Interviews are completed for an animal welfare position. The new farm will be complete this year so 2022 may be a good year to have our meeting at Auburn. Wilmer Pacheco has been working on feed milling and nutrition on particle size, feed forms, and pellet diameters and how these factors influence broiler performance. His lab is working on development of a methodology to analyze particle size inside the pellets to better target requirements for pelleted diets. They have been working on a project including whole corn pre-pelleting. Additionally, he is working on exogenous enzymes, arginine levels, and organic minerals influence on broiler performance and processing yield. Ken Macklin is working with litter treatments and their impact on *Salmonella* and *Clostridium*. Dianna Bourassa is working on in-plant food safety through chemical interventions and biomap sampling. Her graduate student is working on a *in vitro* system for sampling dust produced from litter. She is completing a project on euthanasia methods for broiler breeder and turkeys and will be starting a new master's student that will be working in the area of broiler stunning and meat quality.

Michigan State - Janice Siegford has been working on looking at the litter use patterns by hens of different genetic strains. She is looking at kinematics related to their dynamics as well as inter-bird distances to get a sense of how crowded they perceive the litter area and whether different patterns of litter use might make some hen strains better fits for some systems and others for other systems. She is looking into the effects of daily closures into the litter area as well as a pre-training period where the hens are kept confined before they are allowed out. Her graduate student is working with wing flapping behavior involving the hen standing up very tall and extending wings fully. She is also working in precision livestock farming for laying hens in tiered systems. Her lab is completing projects related to ramp use and rearing environments.

Mississippi State – There is a new department head, Alex Tomlinson. Pratima Adhikari is working with pullets and post-peak and late lay egg production layers. She is investigating several areas including the impact of protease in digestion, limestone feeding parameters, and LED lighting color effects. In the future she will be looking at perch materials. Wei Zhai research focus has been focusing on reducing amino acids and metabolizable energy and the impact of these on woody breast, internal organ development, and economic return. She is also working on the impact of slowing growth on bird welfare. She has observed that woody breast and gut health are related through coccidiosis investigations. Studies looking at bile salt hydrolase

inhibitors that decrease fatty digestion are in progress to assess their impact on the effects of probiotics. John Linhoss has been looking at crop fill and performance at 7 and 14 days and found that it is not a good predictor of early performance. He also has a lighting project characterizing light intensity in naturally and artificially lit houses. He is also working on an electrical grounding project to prevent damage that can be caused by lightning. Future studies will include sanitation of broiler hatching eggs and the ability of biochar to mitigate *E. coli*. Kelley Wamsley is doing an isoleucine requirement work. They should be starting back on research in August. They have been working with Cobb on lysine requirement in each phase of growth. They will also be looking at variable levels of digestible lysine. They have a US Poultry & Egg grant to look at two different phytase at small inclusions looking at bone mineralization and IP esters. There is some benefit of combining two different phytases. Future work will include starter feed quality.

North Carolina State University – NCState has hired a reproductive physiologist and preharvest food safety microbiologist. The endowed layer professorship will be reopened. An aviary will be built at the Piedmont research station. A poultry house will be remodeled. They have approval to process eggs for sale to the university. Lingjuan Li is monitoring ammonia production, deposition, and impact on soil health. She has also been looking at broiler heat stress, behavior, foot pad quality, and meat quality of large broilers effected by air speed and temperatures. Tom Vukina has been working on estimating the welfare effects on proposition 12. The loss to the consumers as a result of proposition 12 was approximately \$1.25 billion. Future work will be focused on developing a model understanding why voting patterns are not consistent with purchasing patterns. Ken Anderson is working on egg storage quality and influence of plasma proteins and oregano extract on productivity. He currently looking at oregano products on internal parasites in range birds and range use behavior patterns. He is also looking at density on broilers. There are additional projects on keel bone damage.

Pennsylvania State University – John Boney is working on the effect of variations in nutrient profiles in broiler diets on their performance. He is also working with nutrient segregation, pellet quality, and probiotics with turkeys. He is working with Paul Patterson on soybean meal particle size for broilers and laying hens. Paul Patterson has been working on dietary strategies to mitigate nitrogen excretion including feeding ketoacids and hydroxy acids instead of amino acids to reduce the level of dietary nitrogen. He outlined the environmental impact and performance from synthetic amino acids in organic production. His lab recently completed studies looking at insects as an alternative ingredient using black soldier fly larva, larva meal, and larva oils for laying hens. Work is being completed using UV light on liquid egg whites and hatching eggs to reduce bacterial load. Hatching egg embryo viability was also determined following pulse UV light. His lab works with vegetative buffers for water quality, air quality, screening biomass, and energy conservation.

Virginia Tech – Mike Persia is working on laying hen nutrition and broiler gut health. He is looking at amino acid requirements for laying hens. He plans to investigate calcium and phosphorus requirements for pullets bone development in the future. He is looking at litter dry matter impact on broiler gut health and necrotic enteritis.

University of Connecticut – Mary Anne Amalaradjou is looking at in-ovo probiotic supplementation for growth improvement. Indu Upadhaya is new to U Conn and is working towards promoting the research being done including information on antimicrobial resistance and probiotic use.

University of Hawaii – Rajesh Jha works on broiler nutrition and feed evaluation. He is now working on gut health evaluating ingredients on whole system responses and metabolic pathways. He is investigating which particular compound is influencing system responses. Birendra Mishra is a physiologist working on heat and oxidative stress physiology. They are using laying hen models for molecular expression pathways. Dr. Kim is working on muscle biology myostatin.

University of Illinois - Ken Koelkebeck is working with Rich Gates and E.G. Chong on portable monitoring units for CO₂, ammonia, and temperature sensing in cage and aviary facilities. They found a range of temperature difference in cage systems and a range of CO₂ and ammonia in aviary systems with seasonal differences. There remains a lot of monitoring work to be done including dust particle size and ventilation needs.

University of Kentucky - Tony Pescatore has been working on influencing bird movement in free-range hen production. Portable shade covers influence bird movement by attracting the birds. They also looked at performance predictors by assessing producer personality traits. They can predict 41% of the variability of production and 67% of the production parameters. Emotional control and compliance to structure were the most important elements. A quantitative measure of keel bone structure was used to examine deviations over time when zinc levels were adjusted. They have also looked at egg injected gamma vitamin E reduction of green muscle disease. Tayo Adedokun is looking at the effect of stress on performance and nutrient utilization in laying hens. The stressors used were coccidia vaccine challenge, dexamethasone, and heat stress. In the dexamethasone challenged birds, performance, nutrient digestibility was not affected, but nitrogen utilization was significantly reduced. A student is working on the effect of different lipids and oxidation levels on fatty acid deposition and lipid quality in broiler chicken.

University of Maryland - Shawna Weimer is looking at the effects of *Salmonella* challenge on two different broiler genotypes looking for cytokine markers in blood plasma and microbiome data. She is looking at sickness and comfort behaviors of *Salmonella* inoculated birds. She is collaborating on a project with a Purdue University validating new methods to analyze leg bone morphology and integrity for evaluating enrichments and lighting on behavior. She is working with USDA on coccidia research quantifying lesion severity. She is working along with computer science department to develop computer algorithms to automatically detect chicken behavior.

University of Minnesota – Sally Noll has been working on a partially slatted floor system for raising turkeys to determine the kind of flooring, amount of space needed for bedding area, and

impact on carcass quality. Small field trials are underway and look positive. She has also been collaborating on footpad scoring systems in correlation with litter particle size characteristics.

Guest Speaker – Warren Beeler, Kentucky’s State Governor’s Office of Agriculture and Policy
Projecting a positive view of agriculture in the 21st century

Tony Pescatore: When Kentucky had the tobacco settlement, the state of Kentucky decided that half of the money that was created would go into investment in agriculture. The governor's office of AG policy oversees the use of those funds. The AG finance corporation gives loans to beginning farmers and other operations. Last year alone the finance corporation gave out \$18,000,000 in loans with a third going to poultry operations. Warren is a big advocate for agriculture and youth programming. Warren has an understanding of what policies need to be in place.

Warren Beeler: Kentucky received \$110,000,000 of which \$36,000,000 was received for agriculture. This amount goes down about 4% per year due to decrease in cigarette smoking. Of this 35% goes to the counties based on the tobacco base from 1997. With this there is a 50:50 cost share program. Of this \$636,000,000 has been utilized for county and regional projects. A major goal is to have cooperatives that have operations beyond sale of animals or grain. During low ethanol prices, an ethanol plant converted to hand sanitizer allowing for flexibility of operations. Kentucky has an energy program for poultry house improvements. Water conservation and treatment has a program for future development. AG finance works with lenders in the beginner farmer program. Improvements in feed conversion and technologies have greatly enhanced agricultural production. An Agritech Advisory Council has been established for improving Kentucky agriculture. Engineering for labor improvements will be important for the future, particularly in this time of COVID-19 pandemic. Hemp has been invested in and has had some challenges with taking a foothold. While it is known to have a lot of potential, there is a lack of science to back it up. There has been a request to grow artemisia for treating malaria and potentially cancer. Perceptions of agriculture need to be improved. Passion for agriculture will lead to success.

Paul Patterson: Is there any work on hemp seed meal for licensing?

Warren Beeler: There are concerns about it. FDA is not moving on it. Murray State is doing some work feeding hemp seeds to layer hens and omega 3s are high. It seems very promising as livestock feed. A large issue is the schedule 1 narcotic but uses are very intriguing. There is much to be learned.

Tony Pescatore: What do you think the biggest change will be from COVID-19 challenge?

Warren Beeler: Vertically integrating and expanding ownership. There has been changes in how food is purchased and used. It is really unknown right now. Poultry has allowed young people to get back into agriculture.

Collaborative Research Discussion

Jorge Vizcarra suggests we work together on submitting a grant for the use of hemp in poultry production. Tayo Adedokun brought up the concern of the regulation of these products but feels this would be a good venture.

We have excellent opportunities in for collaborative research. Many of us have a link to bird welfare across poultry types. The relationship between parasites and range bird production is a needed topic area.

As a group we need to develop symposiums for the annual Poultry Science Association meeting to increase our visibility. The proposed symposium for the cancelled Poultry Science Latin American meeting will be circulated for adaptation for future submission.

Workforce development is a critical need. Kentucky has put together a poultry curriculum (Kentucky Poultry Federation).

The mid-year meeting is currently planned for IPPE in Atlanta in January.

Paul Patterson motioned to adjourn the meeting. Seconded by Anup Johny.

Meeting adjourned at 4:00 pm.