

**NE-1442 Annual Meeting:
Poultry Production Systems and Well-being: Sustainability for Tomorrow
Minutes**

July 29-July 30, 2019

University of Hawaii

Honolulu, HI

Monday, July 29, 2019

The meeting was called to order by John Linhoss at 8:40 am.

Introduction of Participants:

- Birendra Mishra- U Hawaii- Poultry reproduction
- John Linhoss – Miss State - Biosystems engineering
- Tayo Adedokun - U Kentucky - Poultry nutrition
- Kelley Wamsley - Miss State – Poultry nutrition
- Janice Siegford - Michigan State – Laying hen non-cage; behavior, welfare, monitoring
- Ken Koelkebeck U of Illinois –Laying hens, broilers turkeys, 4-H
- Tony Pescatore – U Kentucky – Poultry nutrition and Mgmt, Extension
- Pratima Adhikari – Miss State – Poultry nutrition
- Brett Ramirez – Iowa State - Biosystems engineering
- Shawna Weimer – Purdue – Postdoc, broiler welfare and management
- Dianna Bourassa – Auburn – Processing food safety and welfare
- Ken Macklin – Auburn - Disease and management
- Heng Wei Cheng – USDA ARS
- Alex Corzo – Aviagen
- Chris Rude – Devenish
- Jorge Vizcarra – Alabama A&M
- Mary Anne Amalaradjou – U Conn
- John Boney – Penn State
- Wei Zhai – Miss State – Poultry nutrition
- Myrna Cadena - UC Davis, sub for Maurice Pitesky
- Tom Vukina - NC State
- Anup Johnny – U Minnesota
- Mike Persia – Virginia Tech

Welcome from University of Hawaii

Walter Bowen – Associate Dean for Research

University of Hawaii, a land grant University, is highly supportive of the work and research that are conducted in multistate projects. University of Hawaii's college of Tropical Agriculture and Human Resources has 6 departments (Family and Consumer Sciences, Human Nutrition, Food and Animal Sciences, Molecular Biosciences and Bioengineering, Natural Resources and Environment, Plant and Environmental Protection Sciences, and Tropical Plant and Soil Sciences. The department of Human Nutrition, Food and Animal Sciences houses the poultry research group.

Change in agenda

Due to concerns about biosecurity regarding participants coming from multiple states and facilities, the planned farm tour was replaced with lab tour on campus.

Approval of minutes of 2018 meeting

Anup Johny requested two spelling changes. Anup, thereafter, moved a motion to approve the minutes of the 2018 annual meeting that was held in West Lafayette, IN. This was seconded by Kelley. Kelley moved for the approval of the minutes of the midyear meeting that was held in Atlanta, GA. This was seconded by Tony Pescatore. The two minutes were approved by unanimous vote.

NE-1942 update by Ken K

The new NE-1942 project has been approved and will start Oct 1, 2019 through Sept 30, 2024. Members that have not registered with the new Multistate (NE-1942) were encouraged to do so by working with the university director of their respective experimental station. This process involves going to the NIMMS website and completing Appendix E.

It was announced by John Linhoss that NE-1442 received the NERA Award for Excellence in Multistate Research. Our project was entered into the national competition by Ken Koelkebeck. He worked with Kumar Venkitanarayanan to send our information in for this award.

Nomination of 2020 Jr. Executive

Tayo Adedokun was the Jr. Executive for 2019 and will be the new Sr. Executive for 2020. A nominating committee was appointed by John Linhoss and tasked with the nomination of a new Jr. Executive.

The nominating committee appointees: Ken Koelkebeck., Tony Pescatore, and Kelley Wamsley. The nominating committee nominated Brett Ramirez (Iowa State University) for Jr. Executive.

Tayo Adedokun will move up to Sr. Exec in 2020

Dianna Bourassa will continue as secretary in 2020

Brett Ramirez was nominated and accepted Jr. Exec in 2020

Meeting location for 2020

Option 1 – Tony Pescatore suggested Louisville, KY either the day before or the day after the PSA Annual Meeting July 20-23, 2020. With this option, there would be a Saturday night activity on July 18 with the meeting on Sunday July 19.

Option 2 – Tony Pescatore and Mike Persia also suggested that NE1942 might have the meeting in conjunction with the Latin American PSA by putting together a symposium during the Latin American PSA meeting. The meeting will be held in Foz do Iguacu, Parana, Brazil from October 6-8, 2020.

Mike Persia, Tony Pescatore, and Tayo Adedokun were directed to check with Jon Cole about this possibility. Issue about language was raised and, Mike Persia confirmed both the dates and the mode of communication (meeting is in English with available translation when necessary). Ken Koelkebeck brought up a concern for a lack of US participation in the meeting. Mike Persia mentioned that there is a lack of commercial poultry production near the meeting location.

Option 3 – World's Poultry Science meeting in Paris, France was suggested by Janice Siegford. We concluded that all of the symposia slots were likely filled up by now.

Option 4 – Ames, Iowa at Iowa State University, Brett Ramirez to host.

Following discussion, the top option was concluded to be Brazil with either Louisville or Iowa as a backup. Voting for the backup option was set for Tuesday. A committee was formed to finalizing the 2020 meeting location – Mike Persia, Tony Pescatore, Tayo Adedokun. Auburn was proposed as a potential future location (2021 or after).

Meeting Follow-up

The minutes of NE1442 2019 meeting and the station reports are expected to be uploaded to the NIMMS website within 60d after the meeting (~September 30). There will be a midyear meeting at IPPE in Atlanta (January 29, 2020). The date, time, and location need to be coordinated with Ken Anderson. John Linhoss will contact Ken Anderson to set up the meeting.

Report Submission

John and Kelley will put together a template for station report submission to include reference format (*Poultry Science*), and type of references allowed (refereed journal articles, refereed extension pubs, proceedings, etc.). Reports should include the introduction, impact, and references section and should be under 500 words (not including references). Each university will submit only one report with multiple scientists combined. Report text by objective will need to be separated by objective. The summary of accomplishments for the past five years NE-1442 will use older format. The full report could be sent to all the experiment stations that are involved in this group as a demonstration of the work being accomplished.

Station Reports

Auburn – Joe Hess has retired and his position is not currently being filled. The Poultry Science department is still looking for a department head, is working towards finishing construction of a new farm which will include everything from farm to fork. Jeramiah Davis is the new head of NPTC (National Poultry Technology Center). The extension team currently has three members: Ken – animal health, Dianna – processing, Wilmer – feed milling.

Alabama A&M – The appetite hormone ghrelin has an opposite effect in poultry opposite to that of mice. In poultry ghrelin is a stress signal instead. During research trials the agonist and antagonist did not act as expected. Trials will also be conducted to look into the impact of acites on appetite hormone. Chickens will be used as an animal model for memory studies and work towards obtaining NIH funding is in progress.

Kentucky – A new poultry research farm is being built. Research in the area of keel bone deformities and damage is being conducted using egg scanner to look at bone, multiple breakage of keel tip. The impact of zinc source on bone deformity is being investigated. Research investigating feed additives for coccidiosis, stressors such as cocci challenge, heat stress, and layer time to recovery following heat stress are being investigated.

Miss State – A new poultry building is being built as well as a BSL-2 farm facility. There will be a new Bio-systems department head and a new position will be announced for an avian reproductive physiologist. Multiple research area are being investigated including laying hen production in multiple housing types, new cage free and free range house egg quality and keel bone assessment using CT scans, effects of light wavelength on egg production and hormone release, nutritional strategies to feed broilers, digestible lysine, enzyme work with super dosing phytase, starter particle size, digestible isoleucine requirements,

robotics, unmanned vehicles, lighting intensity control, biochar litter amendment, ventilation and pad maintenance, crop fill correlation to 7 d weights, woody breast and gut health with different levels of AA variability depending on bird strain, impact of bacillus subtilis on coccidiosis, and impact of probiotics on bile salts.

UC Davis – There is not an extension specialist. Work is being conducted through workshops to help people connect with sources of poultry information. Social networks are being analyzed to assess backyard live bird movement.

Minnesota – Funding for renovations to the poultry teaching and research facility are being obtained, a new avian reproductive physiology position will be advertised, and a fellowship partnership with vet school has been made. Research is being conducted on turkey flooring systems, footpad dermatitis, microbiome analysis (working with Tim Johnson), probiotic development for turkeys which has advanced to field application, and essential oils including sensory analysis.

Virginia Tech – New broiler and turkey/multiuse facilities are underway. Leonie Jacobs (animal welfare) will be joining NE1942. Ken A. has been looking at energy requirements between cage free and battery cages.

Penn State – An avian reproductive physiologist position is open and two new county based educators have been hired. Research is being conducted on on-farm nutrient segregation and turkey management and lighting. Paul Patterson is currently on sabbatical in Spain working with vegetative buffers and alternative proteins.

U Conn – Mike Darre has not been replaced leading to fewer extension FTEs. The future direction will be to bring in county educators and new food safety faculty. Current research is being conducted on pre and post-harvest food safety natural compounds and *in-ovo* strategies to improve muscle development and growth.

Hawaii – There are two faculty working on poultry including research topic areas of gut health, nutrition, alternative feed stuffs available in HI, egg production reproductive physiology, heat stress on egg production, oviduct genes, antioxidants easing heat stress, myostatin impact on muscle growth, and egg farm and pasture poultry.

U Illinois – Animal Science has a new department head (Johnson) and two poultry faculty. The university is working to build a feed technology center to replace feed mill, there is a lack of funding for needed dairy farm, the university is AALAC accredited and serves a small poultry industry with progressive producers including layers, game birds, and few broiler operations. Research is being conducted on amino acid digestibility, private and donor research in cage facility, portable monitoring units for ammonia, CO₂, and temperature in belted cage houses and aviaries, and stratification in aviaries.

NC State – Research is being conducted on the economic impact of the ban on cages, willingness to pay for animal welfare, belief on product health advantages, and economics of obesity.

Maryland – Maryland is the state with the highest density of broilers. Work is being done conducting grower workshops, building industry relationships, and assessing welfare needs. New positions are being added including a new muscle biologist for fish and an avian influenza position in the vet school. There has been a campus farm expansion with renovated semi-commercial broiler houses. Research is being conducted on broiler enrichments, willingness to pay for slow growing broilers, and salmonella challenge in conventional vs. slow growing flocks. There will be a Small Flock Expo on February 29, 2020.

USDA-ARS – The livestock behavior research group has five scientists (100% research) working on animal welfare research in swine, poultry, horses, and aviary production

systems. There was a targeted poultry lead scientist hired. Research topics include laying hens and broilers, reduction of heat stress with water temperature, probiotics to reduce injury behaviors, and synbiotics (combination of pre and probiotics) to reduce lameness and increase skeletal health.

Michigan State – Facilities were updated in 2014 and are now getting renovated with more aviaries. Zac Williams was hired as a new extension faculty member. Research is being conducted on the impact of composting conditions on bacterial loads, hen aviary behavior and welfare, bird space guidelines, circadian rhythms, strain differences, rearing conditions that influence aviary system lay keel damage, and the impact of delaying movement to the laying house.

Iowa State – New bird facility has been constructed including cage free, enriched colony, and broiler pens in one facility. Research is being conducted on air quality, heat moisture reduction, keel bone damage, and perching behavior.

Break at 10:45 am

Guest Speaker – Dr. Alex Corzo, Sr. Poultry Nutrition Specialist, Aviagen
Critical Research Needs in Broiler and Broiler Breeders

Aviagen is a subsidiary of EW Group which is involved in broilers, turkey, layer, and fish breeding in addition to other areas. Primary breeders have consolidated to two groups Aviagen and Cobb. The headquarters of Aviagen is located in Huntsville AL. Satellite facilities are located mostly in the Southeast US, Oklahoma, and New York. Major Salmonella monitoring programs. Global parent stock population of 553 million birds with about 90 m birds within each region except Asia (~180 m) which is steadily growing. Genetic changes take about 4 years to appear in commercially available broilers. Over 40 traits are evaluated for selection.

Research Areas of Impact

<u>Health</u>	Broilers: ABF/NAE substitutes Coccidiosis NE, legs health (femoral head necrosis, BCO, mycoplasma, reovirus) Probiotics/microbiome
	Breeders: Feed management Blackhead Behavioral

<u>Hatchery</u>	Gain time for sexing at hatch Hatching at the farm In ovo sexing at the hatchery for parent stock Chick quality with no antibiotics
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<u>Nutrition:</u>	AGP Ionophores Blackhead Feathering Feed form Digestible Ca, P, Gly+Ser Diluents for parent stock Feed management of parent stock
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Broiler Issues Reported: Breast myopathies, broiler performance (feed conversion, gain, yield, paws, livers), Feed physical form/feed intake, feathering/scratches/dermatitis, first week

performance, skin pigmentation, leg issues, gut health/feed passage, mortality, foot pad dermatitis/hockburns, litter quality, chick quality, meat yield, balance issues, uniformity
Breeder Issues Reported: Feathering, laying performance, behavior, hatch/fertility, mortality, feed quality, egg size, bodyweight control, leg issues, feed clean up time, chick quality, fleshing/fat at point of lay, shell quality,
Showed video of differences in feeding behavior based on male or female lines
Showed video of feather sucking behavior due to feed restriction
Showed video of feed waste when a high percentage of fines are present

Lunch at 12:15 pm

Guest Speaker – Chris Rude, Poultry Layer Nutritionist, Devenish

Hot Topics in the Layer Industry

There are 331 million laying hens which is about 10 m more laying hens compared to same period of last year leading to too many eggs on the market. There are 51.3 million non-organic laying hens that are cage free with 5% organic. About 2-3% of these birds molted which is not a standard practice industry-wide. Single cycle is 70-100+ weeks with 80-90 weeks common and 90+ weeks, standard. Large variations exist in cage stocking density (44-144 sq. in). Concern in the Midwest due to the need for body heat. Increased pressure to move to cage-free and many egg marketing strategies. Industry is moving towards a larger framed white bird that have better persistency (better end of cycle rate of lay). The lay cycle is shortening down to 22 hours. As of July 1, 2019, 22% cage free (5% organic and 17% non-organic). Cage free and non-organic increasing since 2017. Early transitions to cage free helpful for pullets.

Current Issues:

- False layer
- Cocci – cage free, vaccinations
- Vaccination programs –*Salmonella*, *E. coli*, mycoplasma, coryza, bronchitis, Newcastle, can put stress on pullets, low pullet weights, may affect production. What can alleviate negative effects?
- Coryza
- Virulent New Castle
- *E. coli* – becoming more prevalent, dust due to cage free
- Round worms – safeguard approved, still issue with organic
- Extended single cycle – eggshell deterioration at 90+ weeks, molting not economically feasible, negative impacts add up and cannot be fixed later, reductions in vaccine efficacy
- Cage-free mortality – sources unknown
- Broken keels – improving
- *Salmonella* control – required feed additives
- Gut health – Does broiler data translate
- Egg marketing – does no antibiotic include no dewormers?
- Feed consumption – more feeder space equals higher consumption, how do we limit consumption?

Future directions:

- Extended lay cycle – how long can we go while maintaining egg shell quality and egg size
- Calcium inclusion limits and efficiency
- Brown hens have limited information, lower margins of amino acid ratios, energy needs

- Research diets should reflect commercial feeding programs (g of nutrient per bird per day)
- Record cage space and density
- Record linear feeding space (difference between systems)

Most of new cage-free are white birds and most specialty birds are brown.

Breakout Session – Five Subgroups

Group 1

Variation in management practices and approaches. Lighting types and programs vary both within and between farms. Water quality concerns, how to define what is good or bad. Ventilation in upcoming facility designs. Future of antibiotic free production. How to study these birds from a nutritional standpoint? Shift away from using a bird with an antibiotic as a standard.

Group 2

Meta analysis collecting litter and fecal samples from ABF farms and correlate to performance. Collect some demographic information. Submit preliminary results to NSF or USDA in a grant proposal. Need for cage-free pullet research, design needs. Extended lay research is also needed. Obtain 60 wk good and bad producing hens for extended lay work. Need more breeder research which is a challenge due to lack of researchers and resources.

Group 3

Big data potential in ventilation and facility design engineering. Possibility of survey analysis using 5-10 layer facilities looking for *E. coli* and cocci then analyze for microbiome. Nutritional interventions on gut health, bone health. Analyze for the economic implications of the work that is done to ensure a positive economic impact.

Group 4

There are four groups pursuing USDA-SAS grants this year. We, as a group, should put together a large grant of this nature. There is a need for extension work in backyard poultry growers regarding biosecurity and quarantine. Non-poultry veterinary poultry course coming online at University of Kentucky. They ask the expert on eXtension needs more participants. We could put together some cooperative NE-1942 webinars on various topics such as ventilation, egg producers, backyard poultry production. Interested members are encouraged to contact Tony Pescatore.

Group 5

A potential symposia topic for Brazil could be ABF perspectives from North America (US), Latin America, and Europe angles. Put together a comprehensive literature search on ABF.

Tuesday the new report will be put up to aid in collaborative research discussion.

Anup Johny motioned to adjourn the meeting, Ken Koelkebeck. seconded.
Meeting adjourned at 3:45 pm.

Tuesday, July 30, 2019

The meeting was called to order by John Linhoss at 8:30 am.

NE-1942 Meeting Options

Mike is working on getting the details regarding the symposia program for Brazil.

Next was the vote for our alternative location.

Mike motioned to vote on Kentucky vs. Iowa State.

17 for Kentucky (PSA), 3 for Iowa State

John will send out an online poll for Brazil vs. Kentucky once more information on Brazil is available.

We brought up an outline of our NE-1942 objectives and organized participants into the subtopics.

1. Integrating technological advances into poultry systems:

1a. Engineering and Technology

- Brett (ISU), John (Msstate), Janice (MSU), Myrna (UC Davis), Shawna (UMD)

1b. Environmental Control and Management

- Ken, Rich, Angela (Illinois), John (Msstate), Brett (ISU), John (Penn State), Pratima (Msstate)

2. Establishing and adopting husbandry practices to a changing industry landscape:

2a. Nutrition Strategies and Feed Manufacture

In Ovo Strategies

- Tony (UK), Rajesh (HI), Tayo, (UK), Mary Anne (UConn), Mike P. (Virginia tech)

Alternative Ingredients and Feedstuffs.

- Kelley (Msstate), Mike P. (Virginia Tech), Tayo (UK), Rajesh (UH), John (Penn State), Pratima (Msstaet), Ken (Auburn), Wei (Msstate), Tony (UK)

Use of Exogenous Enzymes.

- Kelley (Msstaet), Mike P. (Virginia Tech), Tayo (UK), Rajesh (UH), John (Penn State), Pratima (Msstaet), Wei (Msstate), Tony (UK)

Feed Manufacturing.

- Kelley (MSstate), John (Penn State), Wilmer (AU)

Layers and Egg production

- Pratima (Msstate), Tayo (UK), Tony (UK), Birendra (UH), Mike P. (Virginia Tech), Ken Anderson (NSCU), Prafulla (NCSU), Darrin (Purdue)

2b. Disease Control and Microbiology

Avian Influenza (AI) and Depopulation.

- Ken Anderson (NCSU), Sally Noll (MN), Paul Patterson (Penn State)

Bacterial Infections of Poultry and Control.

- Dianna (AU), Mary Anne (UConn), Ken M (AU), Shawna (UMD), Anup (MN), Pratima (Msstate)

Footpad Dermatitis and Control.

- Sally Noll (MN),

Red Mite Control (External Parasites)

- Darrin (Purdue), Blatchford (UC Davis), Erasmus (Purdue)

2c. Physiological Response to Environment and Welfare

Litter Restriction in Cage-Free Aviaries.

- Janice (MSU)

Keel-bone Fractures in Cage-Free Birds.

- Darrin (Purdue), Tony (UK), Prafulla (NCSU), Ken A. (NCSU), Brett (ISU),

Role of Space on Behavior

- Janice (MSU), Shawna (UMD), Jorge (AL A&M)

Broiler Enrichment.

- Shawna (UMD)

Heat Stress.

- Heng-wei (USDA-ARS), Tony (UK), Tayo (UK), Birendra (UH)

Housing Systems.

- Pratima (MS State), Janice (MSU), Brett (ISU), John (Msstate)

Economic Impact and Consumer Choices.

- Tom Vukina (NCSU)

Guest Speaker – Dr. Douglas Vincent, Professor Emeritus and Animal Scientist, UH Manoa
Past, Present and Future of Livestock Industry in Hawaii

Started at UH in 1985 as beef reproductive physiologist. Retired in 2018.

Hawaiian island land use pre European contact maps. Polynesians colonized Hawaii 400-500 AD (or 1100-1200 AD). Canoe crops came with the Polynesians. Also brought chickens, dogs, and pigs. In 1778, James Cook arrived in Hawaii and was killed by Hawaiians in 1779. Map of agricultural land utilization in 1937 (can be found on hdoa.hawaii.gov website). Changes shown on map from 1980 and then 2015. Hawaii has the Big 5 companies, Alexander & Baldwin, Amfac, C. Brewer, Castle & Cooke, Theo. H. Davies. Around 2,000 sugar plantations started to disappear. According to the 2017 State Agriculture Census, the number of farms in Hawaii is up 5% from 2012. Average farm size is 155 acres with most of farm income less and \$2,500. Most farmers are 65+ year-old, but a big group falls between 35-64 year-group. According to the 2015 Crop Summary by Acreage, coffee, diversified crops, macadamia nuts, seed production, and pasture land are the top crops (by acreage). Total agriculture value hasn't changed much since 2002 at \$563,000,000. Hawaii floriculture value dropped after USDA grant lost in 2010. Seed crop research was high in 2009-2011 but has decreased in recent years due to dislike of GMO.

Aquaculture is growing. Top commodities are seed crops, macadamia, cattle, coffee, other aquaculture, algae, papayas, milk, and bananas. Fruit market share 47% local bananas, total fruits 37%. Vegetable market share is 99% watercress, 91% sweet potatoes, 82% Chinese cabbage, etc., with 37.8% total vegetable market share. George Vancouver brought cattle to Hawaii in 1794. They were allowed to roam until 1830. Mexican cowboys were brought in to manage the cattle. Check out the movie “Paniolo O Hawaii”. Cattle industry is top livestock industry valued at \$34 m with 1,047 ranches. In the 1980s, corn prices increased, slaughter houses closed, and cattle are now shipped to the mainland for finishing. Most of the beef is grown on the big island. Hawaii and Maui have the majority of pastureland. Pastures are rainfall fed, no irrigation. Dairy in Hawaii decreased after 1995. Before 1983, market share was 100% for milk. After 1983 heptachlor contamination of Oahu’s milk supply, importation of fluid milk was permitted. Only two dairy farms remain. Egg production has declined since 2001. Layer inventory in 2017 was 192,185. There are 81 broiler farms, 674 layer farms, 12 turkey farms, 121 duck farms, and 87 rooster farms. Local eggs are \$5.99/doz. Imported eggs are \$4.39/doz. Hogs are a stable industry but relatively small. Most farms less than 25 sows. Mostly farrow to finish. Most pigs are on Oahu because the market is there (Luaus). Fruit and vegetable import has expanded rapidly. If Hawaii could increase production, many more jobs could be available (Leung and Loke, 2007). Need to find young farmers and get them on the land. Go Farm Program can help with finding new farmers.

Birendra promised to send out the presentation slides.

Guest Speaker – Dr. Jennee Odani, Extension Veterinarian, UH Manoa
Health-Related Issues of the Poultry Industry in Hawaii and Pacific Islands
Thanks Shawna for taking notes.

- 4 slaughter plants in the state - no poultry
 - Challenges: waste management and permits
- Cattle breeds are mostly Angus and Hereford, some Brahma
- “Heath related issues of the poultry industry” Jenee Odani Associate Specialist/Extension Veterinarian
 - BA at University of Washington, DVM and Anatomic Pathology residency at UC Davis
 - 2006-2016 Hawaii Department of Ag Diagnostician, Veterinary Medical Officer, laboratory director
 - 2002-2003 California Exotic Newcastle Disease Outbreak
- Poultry industry in HI
 - Pacific Poultry processing closed in 2004, killed the broiler industry, had 20+ commercial layer farms that supplied 85% of egg market, currently have 4 layer operations with 1 on the way and 2 broiler operations with USDA exemptions (small, 5,000 or so)
 - Japanese supermarkets have exclusive source with one egg producer
 - Diseases: fowl pox, botulism type c, stick tight fleas, mites, cocci, lice, eye worms, tapeworms, *Ascaridia galli*, *Heterakis gallinarium*, *Capillaria spp.*, *Tetrameres Americana*, *Dispharynx spiralis*, *Trichomoniasis*, *Hemoproteus sp.*, *Mycoplasma synovia*, heat stress, infectious bronchitis
 - FOIA process is weak, everyone knows everyone, everything is dumped every 2 years

- Salmonella on egg shells- 1990s- started as a high school project, dept. of health took notice, 3 of 12 brands were implicated for salmonella positive
- 1998- SE type 4 in humans, linked to a single farm in Oahu, environmental and avian samples were collected from egg facilities and wildlife, no native birds tested positive
- CTAHR extension helping 4 commercial layer farms develop egg quality assurance plans, biosecurity, mesh fences to keep cats, mice and mongoose out
- Kauai chickens- not sure about laws, if the bird is on your property you are free to do what you want with it, no natural predators (mongoose) on Kauai
- 51st state to participate in NPIP, joined in 2018, Jenee is the only tester for HI, auditors will be egg graders/QA
 - New farmers who have heritage/exhibition birds that are interested in exporting birds and eggs
- State disease programs for poultry
 - Pre-arrival isolation for 7 days (if birds are 4 weeks or older); enter within 36 hours of completing isolation; no live vaccines within 60 days of shipping; individual ID; necropsy and AI testing of DOAs
- Can bury dead on-farm in a disaster

Guest Speaker – Dr. Birendra Mishra, University of Hawaii

Poultry Research Works in University of Hawaii

Dr. Mishra and Dr. Jha are working on poultry. Mechanism of egg formation in oviduct. Genetic and hormonal regulation of egg production, environmental heat stress, antioxidant compound for mitigation of heat stress. Hen-day egg production cannot increase much more but improvement of egg quality and production as bird's age have potential for improvement. Description of egg formation. Develop model and biomarkers for albumen biosynthesis and eggshell formation. Analyze genes looking at layers, non-layers, and molters. RNA sequencing, sequence analysis, and pRT-PCR assay. Gene ontology enrichment in magnum yielded the greatest activity in L-serine biosynthetic processes. A list of selected candidate genes from the magnum have been identified (many transporters). Analyzed gene expression from non-laying, molters, and egg layers at 3 and 15-20 h post-ovulation. Significant differences observed between 3 and 15-20 h post ovulation. Biological processes, molecular function and cellular components impacted when looking at eggshell formation (15-20 h layers vs. non-layers). Heat stress is a significant issue for egg production. With cyclic heat stress for 3 wks, genes with calcium function were depressed. Used antioxidants to try to mitigate heat stress with broilers.

Dr. Jha is serving as a visiting professor at Kyoto University in Japan.

www.ctahr.hawaii.edu/rjha *In ovo* model and in vivo experiments for enzymes prebiotics, probiotics, and synbiotics (combination of pre and probiotics). Gut health parameters (histology, microbiome, growth performance). Alternative feedstuffs available in Hawaii. Pastured poultry production work.

Motion to adjourn the meeting by John, seconded by Kelley.

Meeting adjourned at 11:37 am.