

1998 PSA Annual Meeting Program

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This Meeting is worth
up to 20 ARPAS
Continuing Education Units.

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Important Telephone Numbers

PSA Registration and Information Desk

Telephone (814) 863-5166

Penn Stater Hotel Information Desk

Telephone (814) 863-5000

Fax (814) 863-5001

Host Committee

Bill Weaver (814) 865-3411, e-mail: wdw2@psu.edu

Ruth Nyman (814) 863-2101; e-mail: ren4@psu.edu

Poultry Science Department

Telephone (814) 865-3411

Fax (814) 865-5691

e-mail ren4@psu.edu

North Residence Halls

Telephone (814) 865-9522

Fax (814) 863-5647

Police/Fire/Emergency

Emergencies 911

University Safety and Police Offices (814) 863-1111

Pennsylvania State University Operator (814) 865-4700

Hospital

Centre Community (814) 231-7000

Mail Service

Your mailing address during the meeting will be:

Your name
PSA '98
The Pennsylvania State University
The Penn Stater Conference Center Hotel
University Park PA 16802-7002

Tourist Information

Lion Country Visitors and Convention Bureau
Telephone (814) 231-1400 (800) 358-5466
e-mail: cccvb@visitpennstate.org

Check-In and Final Registration

Onsite registration will take place at The Penn Stater Conference Center Hotel. The registration area will be open at the following times:

Date	Time
August 1 (Saturday)	1:00 p.m.-8:00 p.m.
August 2 (Sunday)	7:30 a.m.-7:00 p.m.
August 3 (Monday)	7:30 a.m.-5:00 p.m.
August 4 (Tuesday)	8:00 a.m.-5:00 p.m.
August 5 (Wednesday)	8:00 a.m.-1:00 p.m.

Those who have preregistered may pick up their registration materials at these times. Late registrants may register and pay their fees at the same location and times.

Job Resource Center

Hours:

Monday, Tuesday: 7:30 am - 5:00 pm

Wednesday: 7:30 am - noon

Room: J4, J5, and J6

Stop by the rooms to view the 30 plus resumes and many job descriptions. The self-operating set-up facilitates interviews either in the Interview Rooms or outside the center. University and Industry people in attendance are strongly encouraged to contact these people before, after, and during the meeting. Remember that PSA operates a year-round job center at its web site: www.psa.uiuc.edu/

Membership Directory

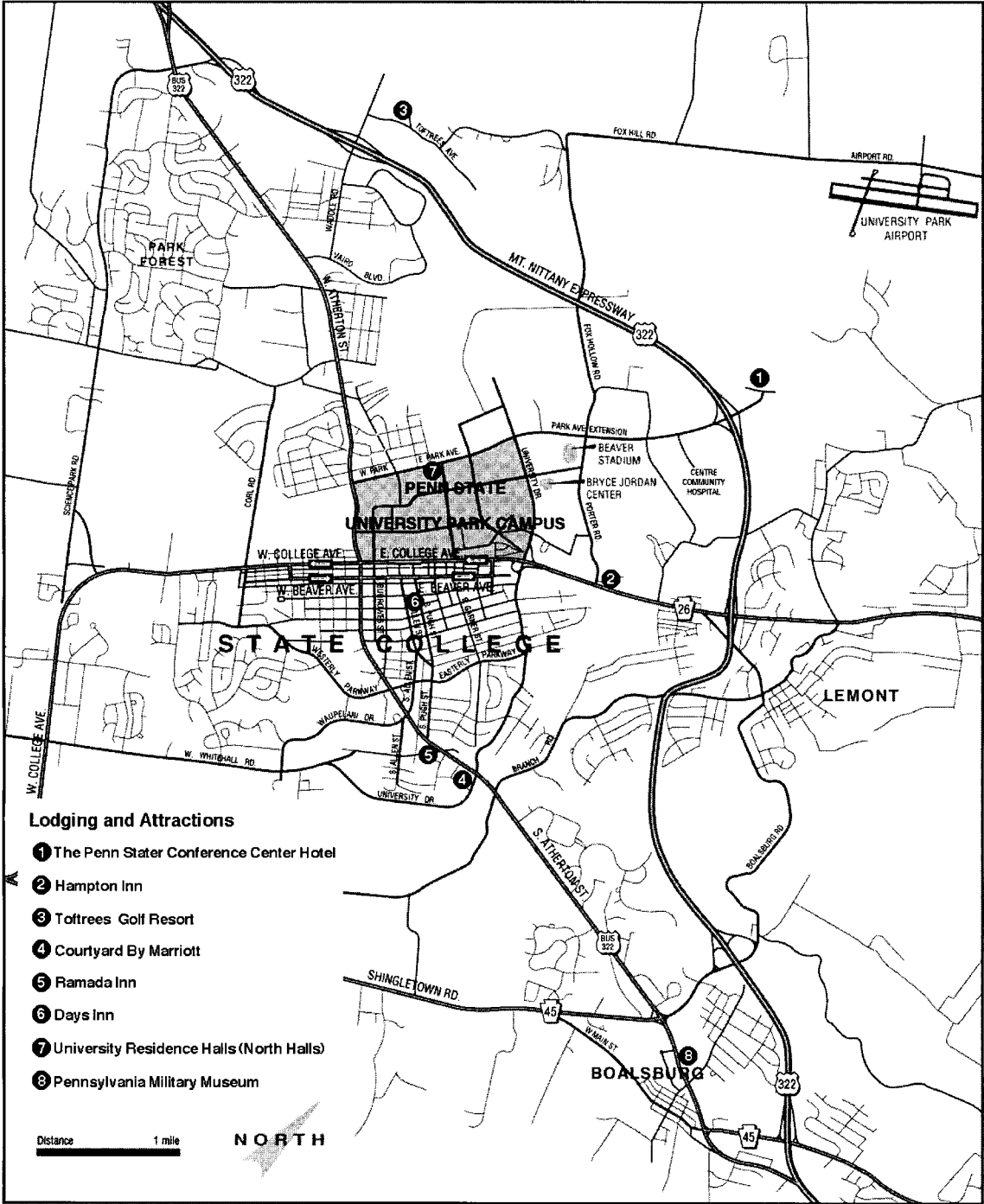
Pick up your copy of the *FASS Membership Directory* during the meeting! The 1998–2000 *FASS Membership Directory* will be distributed (after proof of 1998 PSA, ADSA, or ASAS membership) in the registration area beginning Sunday afternoon through the end of the meeting. This 380+ page book will contain the joint alphabetical listings of ADSA, ASAS, and PSA members (over 10,000 names) and a geographical breakdown for each society.

Awards Banquet Favor

Pfizer Poultry has chosen to sponsor the 1998 Awards Banquet favor. This unique gift represents the Amish culture and celebrates the Commonwealth of Pennsylvania's agrarian work ethic. Please take the time to thank Pfizer professionals in attendance at the meeting and when speaking to them after the meeting. Thank you Pfizer for your continued support!

Meeting Evaluations

You will find an evaluation sheet in the nylon tote bag. Please complete a form, as your input is critical in the planning of future PSA Annual Meetings. Return completed forms to the registration area. Thank you!



Lodging and Attractions

- 1 The Penn Stater Conference Center Hotel
- 2 Hampton Inn
- 3 Toftrees Golf Resort
- 4 Courtyard By Marriott
- 5 Ramada Inn
- 6 Days Inn
- 7 University Residence Halls (North Halls)
- 8 Pennsylvania Military Museum

Distance 1 mile

NORTH

PSA 87th Annual Meeting Donors

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** Donation includes funds to the Ancillary Scientists Symposium. Donors as of June 25, 1998.*

Thank you very much for your support, especially to those companies that support the PSA Annual Meeting and Corporate Membership.

1998 PSA Annual Meeting Exhibitors

Visit the Exhibits at PSA '98!

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Monday - 10 am - 5 pm

Tuesday - 8 am - noon

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1111 N. Dunlap Avenue

Savoy, IL 61874

217-356-3182, FAX: 217-398-4119

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PSA '99

POSC-0114
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Fayetteville, AR 72701
501-575-2025; FAX: 501-575-3026
The University of Arkansas promotes the 88th meet-
ing of the Poultry Science Association. Pick up info
on Arkansas and mark your calendar to attend PSA
'99 - August 8-11.

PSA Membership and On-Line Activities

1111 North Dunlap Avenue
Savoy, IL 61874
Check out the additional On-Line Membership
benefits available to all PSA members. This includes
access to the full-text articles in *Poultry Science*, all
400 meeting abstracts, information on PSA publica-
tions (including the *Resource List*), and more. If you
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PSA '98 Schedule of Activities

Friday, July 31, 1998

3:00 p.m.-6:00 p.m. PSA Board of Directors
Conference Room M

Saturday, August 1, 1998

8:00 a.m.-5:00 p.m. PSA Board of Directors
Conference Room M

1:00 p.m.-8:00 p.m. On-Site Registration/Information
Conference Registration

10:00 a.m.-8:00 p.m. Hospitality Room
Senate Lounge

6:45 p.m.-7:45 p.m. PSA Ancillary Scientists Symposium
Wine and Cheese Reception
President's Hall

7:55 p.m.-9:00 p.m. PSA Ancillary Scientists Symposium
Keynote Address
President's Hall

Sunday, August 2, 1998

7:30 a.m.-7:00 p.m. On-Site Registration/Information
Conference Registration

2:00 p.m.-5:00 p.m. FASS Membership Directory Pick-Up
Registration Area

8:00 a.m.-8:00 p.m. Hospitality Room
Senate Lounge

7:15 a.m.-5:00 p.m. Slide Preview
Conference Room J-2

8:15 a.m.-5:00 p.m. PSA Ancillary Scientists Symposium—Muscle Growth and Development
President's Hall

8:00 am-11:45 am National Poultry Extension Workshop
President's Hall

1:00 p.m.-5:00 p.m. Informal Nutrition Conference—Impact of Early Nutrition on Poultry
President's Hall

7:00 p.m.-8:00 p.m. Opening Session—Dr. Rustum Roy
President's Hall

8:00 p.m.-10:00 p.m. Elanco Ice Cream Social
Terrace

Youth and Teen Program

6:30 p.m.-8:00 p.m. Get Acquainted Pizza Party
Conference Room K

Special Meetings/Lunches

12:00 Noon-1:00 p.m. Muscle Growth and Development Symposium Luncheon
President's Hall

12:00 Noon-1:30 p.m. Extension Luncheon
Garden's Restaurant

1:00 p.m.-4:00 p.m. WPSA Board of Directors Meeting
Conference Room T-6

4:00 p.m.-5:00 p.m. National Educational Forum on Food Safety Issues
Conference Room T-6

Monday, August 3, 1998

7:30 a.m.-5:00 p.m. On-Site Registration/Information
Conference Registration

8:00 a.m.-5:00 p.m. FASS Membership Directory Pick-up
Registration Area

7:15 a.m.-5:15 p.m. Slide Preview Rooms
Conference Rooms J-2 and T-7

8:00 a.m.-10:00 a.m. Exhibit Set-Up
Dean's Hall

10:00 a.m.-5:00 p.m. Commercial Exhibits
Dean's Hall

7:30 a.m.-5:00 p.m. Job Resource Center
Conference Rooms J-4, J-5, and J-6

8:00 am-12:00 Noon Scientific Sessions

Environment - Management
Room Q

Nutrition A
Room R

Nutrition B
Room S

Physiology
Room H

Processing - Products
Room F

Genetics
Room P

Pathology
Room E

Posters
Dean's Hall

1:00 p.m.-5:00 p.m. Scientific Sessions

Environment - Management
Room Q

Immunology
Room E

Nutrition A
Room R

Nutrition B
Room S

Physiology
Room H

Extension - Instruction
Room F

- Posters
Dean's Hall
- 5:30 p.m.-9:00 p.m. Barbecue
Pennsylvania Military Museum - Boalsburg, PA
Meet in Conference Center Lobby for transportation
- Spouses Program**
- 8:30 a.m.-4:30 p.m. Altoona: The Nation's Storybook of Railroad Life and Labor
Meet in Senate Lounge
- 9:00 a.m.-3:30 p.m. Historic Boalsburg: Birthplace of Memorial Day
Meet in Senate Lounge
- 9:30 a.m. Talk on the Amish People
Senate Lounge
- 11:00 a.m. Doll Making Workshop
Senate Lounge

Youth and Teen Program

- 8:30 a.m.-5:00 p.m. Shaver's Creek Environmental Center
Meet in Conference Room K

Special Meetings/Lunches

- 11:30 a.m.-1:30 p.m. Scientists' Lunch Buffet (ticket required)
President's Hall
- 11:45 a.m.-1:00 p.m. USDA-ARS Luncheon
President's Hall
- 12:00 Noon-1:00 p.m. Michigan State Luncheon
President's Hall
- 12:00 Noon-1:00 p.m. Editorial Board Luncheon and Meeting
President's Hall

Tuesday, August 4, 1998

- 6:30 a.m. Fun Run
Behind Penn Stater Conference Center
- 7:15 a.m.-12:00 Noon Slide Preview Rooms
Conference Rooms J-2 and T-7
- 8:00 a.m.-5:00 p.m. On-Site Registration/Information
Conference Registration
- 8:00 a.m.-5:00 p.m. FASS Membership Directory Pick-Up
Registration Area
- 8:00 a.m.-5:00 p.m. ARPAS Examinations
Conference Room T-6
- 12:45 p.m.-5:00 p.m. Slide Preview Room
Conference Room T-7
- 7:30 a.m.-5:00 p.m. Job Resource Center
Conference Rooms J-4, J-5, and J-6
- 8:00 a.m.-12:00 Noon Commercial Exhibits
Dean's Hall
- 8:00 a.m.-12:00 Noon Scientific Sessions
Environment - Management
Room Q

	Nutrition <i>Room R</i>
	Physiology <i>Room H</i>
	Processing - Products <i>Room F</i>
	Genetics <i>Room P</i>
	Pathology <i>Room E</i>
	Posters <i>Dean's Hall</i>
11:45 a.m.	Golf Tournament <i>Penn Stater Conference Center Lobby for transportation to Golf Course</i>
1:00 p.m.-5:30 p.m.	Symposium: Managing Poultry Reproduction to Satisfy Market Demands <i>Room R</i>
1:00 p.m.-3:30 p.m.	Symposium: Reducing the Environmental Impact of Poultry Production: Focus on Phosphorus <i>Room Q</i>
3:30 p.m.-6:00 p.m.	Symposium: Effective Poultry Programming in the Next Century <i>Room S</i>
Spouses Program	
8:30 a.m.-4:30 p.m.	Mifflinburg and Penns Creek: Historic Pennsylvania Businesses <i>Meet in Senate Lounge</i>
9:00 a.m.-3:30 p.m.	Bellefonte: Victorian Charm <i>Meet in Senate Lounge</i>
8:50 a.m.-12:15 p.m.	Bus Tour of Campus <i>Meet in Senate Lounge</i>
Youth and Teen Program	
8:30 a.m.-5:00 p.m.	Bland's Amusement Park <i>Meet in Conference Room K</i>
Special Meetings/Lunches	
6:30 a.m.-7:45 a.m.	WPSA-USA Branch Breakfast <i>Garden's Restaurant, pay on your own</i>
11:30 a.m.-1:30 p.m.	Scientists' Lunch Buffet (Ticket required) <i>President's Hall</i>
12:00 Noon-3:00 p.m.	American Poultry Historical Society Luncheon and Tour <i>Conference Center Lobby for transportation to Pasto Museum</i>
12:00 Noon-1:00 p.m.	WPSA- Canada Branch Luncheon <i>President's Hall</i>
12:00 Noon-1:00 p.m.	University of Arkansas Luncheon <i>President's Hall</i>
6:00 p.m.-9:00 p.m.	Wisconsin Barbecue <i>Conference Center Lobby for transportation to Barbecue</i>
Wednesday, August 5, 1998	
8:00 a.m.-1:00 p.m.	On-Site Registration/Information <i>Conference Registration</i>

- 8:00 a.m.-10:00 a.m. FASS Membership Directory Pick-Up
Conference Registration
- 7:15 a.m.-12:30 p.m. Slide Preview Rooms
Conference Rooms J-2 and T-7
- 8:00 a.m.-12:00 Noon Job Resource Center
Conference Rooms J-4, J-5, and J-6
- 8:00 a.m.-12:00 Noon Scientific Sessions
Environment - Management
Room Q
Immunology
Room E
Nutrition
Room R
Physiology
Room H
Extension - Instruction
Room F
- 1:00 p.m.-2:00 p.m. WPSA Lecture
Introduction — Leo S. Jensen
The Incredible Functional Egg — William Stadelman
Dean's Hall
- 2:15 p.m.-4:00 p.m. Business Meeting
Dean's Hall
- 6:00 p.m. Reception and Banquet
President's Hall
- Spouses Program**
- 8:30 a.m.-4:30 p.m. Big Valley: Amish Heritage Tour
Meet in Senate Lounge
- 9:00 a.m.-10:00 a.m. Horticulture Trial Gardens Tour
Meet in Senate Lounge
- 10:30 a.m.-12:00 Noon Quilting Presentation
Senate Lounge
- Youth and Teen Program**
- 8:30 a.m.-5:00 p.m. Penn's Cave Tour
Meet in Conference Room K
- 6:00 p.m.-9:00 p.m. Farewell Party
Conference Room K
- Special Meetings/Lunches**
- 11:30 a.m.-1:30 p.m. Scientists' Lunch Buffet (Ticket required)
President's Hall
- 12:00 Noon-1:00 p.m. National Poultry Waste Management Committee Luncheon and Meeting
President's Hall
- Thursday, August 6, 1998**
- 8:30 a.m.-11:00 a.m. Passing the Torch - Meeting of '98 and '99 Host Committees
Conference Room M

Society Sponsored Events

PSA Ancillary Scientists Symposium: Muscle Growth and Development

Symposium Chairs: Sandra Velleman and Regina Vasilatos-Younken
President's Hall

Saturday, August 1

- 6:45 - 7:45 pm Wine and Cheese Reception
7:55 pm Introduction
Regina Vasilatos-Younken, Pennsylvania State University
8:00 - 9:00 pm Keynote Address - Economic Significance of the Poultry Muscle Foods Industry
William Roenigk, National Broiler Council

Sunday, August 2

- 8:15 am Opening Address
James Petite

Session I: Muscle Anatomy and Physiology

Chair: Sandra Velleman

- 8:30 am Functional Properties of Myosin Isoforms in Muscle
Everett Bandman
9:00 am Sarcomeric Myosin Heavy Chain Assembly
Macdonald Wick
9:30 am Muscle Fiber Types in Relation to Poultry Meat Quality
Andre Sosnicki
10:00 am BREAK

Session II: Growth and Development

Chair: Regina Vasilatos-Younken

- 10:30 am Identification of Intracellular Signaling Pathways Regulating Myogenesis
Sally Johnson
11:00 am Influence of Growth Factors on Poultry Myogenic Satellite Cells
Douglas McFarland
11:30 am Absence of GH-Induced Muscle Growth In Vivo
Regina Vasilatos-Younken
12:00 noon LUNCH (included in registration fees)

Session III: Connective Tissue

Chair: Sandra Velleman

- 1:30 pm Dynamic Expression of Proteoglycans During Chicken Skeletal Muscle Development and Maturation
David Carrino
2:00 pm The Role of the Extracellular Matrix in Skeletal Muscle Development
Sandra Velleman
2:30 pm Extracellular Modifications to Muscle Collagen: Implications for Meat Quality
Richard McCormick
3:00 pm BREAK

Session IV: Primary Processing and Product Quality

Chair: Michael Denbow

- 3:30 pm Sarcoplasmic Reticulum Proteins from Turkey Skeletal Muscle: Relationship to PSE Meat
Gale Strasburg
- 4:00 pm Regulation of Calpastatin Gene Expression
Parker Antin
- 4:30 pm Meat Quality During Processing
Alan Sams
- 5:00 pm Concluding Remarks
Sandra Velleman

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1998 National Poultry Extension Workshop Issues and Policies

Sunday, August 2, 1998
President's Hall
8:00 am - 11:45 am

- 8:00 am Welcome and opening comments
Moderator: *Casey Ritz*, West Virginia University
Session: Poultry Welfare
- 8:15 am Concerns of the Humane Society of the United States
Gary L. Valen, Humane Society of the United States
- 8:35 am Industry Realities, Ongoing Efforts, and Future Possibilities
Steve Kopperud, Animal Industry Foundation
Session: Environment
- 8:55 am USDA/EPA Joint Strategy on Animal Feeding Operations
John A. Kosco, EPA Office of Water — Municipal Technology
- 9:15 am Impact of New AFO Regulations on Industry and Environment
Mike Williams, Animal and Poultry Waste Management Center
North Carolina State University
- 9:35 am BREAK
- Moderator: *Patsy White*, USDA
- 9:55 am Washington Update
Rich Reynnells, USDA/CSREES/PAPPP
Session: Human Interactions
- 10:15 am USDA Packers and Stockyards Review of Grower/Company Relationships
John Rollins, USDA Packers and Stockyards Administration
- 10:35 am Diverse Cultures in the Workplace
D. Sunshine Ward, University of Arkansas

Extension Workshop Break Sponsors
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PSA Informal Nutrition Symposium Impact of Early Nutrition on Poultry

Chair: Mamduh Sifri, ADM Animal Health and Nutrition

Symposium Team: D. J. Castaldo, N. Dale, J. J. Dibner, W. Guenter, W. Robey, and J. L. Sell

Sunday, August 2, 1998

President's Hall

1:00 pm - 5:00 pm

- 1:00 pm Precision Early Nutrition Is a Serious Business
Mamduh Sifri, ADM Animal Health and Nutrition
- 1:15 pm Are Metabolic Responses Affected by Early Nutrition?
Y. Noy, Hebrew University and Miloubar Central Feed Mill, Israel
- 1:55 pm Is the Gastrointestinal Function Rate Limiting for Performance?
W. James Croom, North Carolina State University
- 2:35 pm Break
- 3:00 pm Early Nutrition and the Immune System
Julia J. Dibner, Novus International
- 3:40 pm Practical Applications of Early Nutrition
M. S. Lilburn, Ohio State University
- 4:20 pm Review of Presentations
Zehava Uni, Hebrew University, Israel
- 4:30 pm Open Discussion and Recommendations
- 5:00 pm Adjourn with Plans to Improve Early Nutrition for Poultry

Informal Nutrition Session Break Sponsors

ALPHARMA

Griffin Industries, Inc.

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Managing Poultry Reproduction to Satisfy Market Demands

Sponsored by:

BioPore
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Tuesday, August 4, 1:00 pm - 5:30 pm

Room R

Honorary Co-Chairs: Peter Lake and Edward Buss

General Chair: Rupert Amann

Objective and Approach: Recent Advances in characterization of reproductive process in avian species provide a critical mass of information to allow evaluation, on an individual by individual basis, of reproductive effectiveness for both males and females. The industry depends on genetic selection to identify males of high potential economic value, but full return on that effort is not realized unless each male is fully utilized in a manner consistent with overall management needs. This symposium will highlight the challenges and evolving strategies for addressing a growing problem in the poultry industry: slow loss of reproductive effectiveness associated with genetic and management changes needed to meet ever-more demanding requirements for product cost and quality. The integrated series of presentations will illustrate how the primary breeder and producer can evaluate reproductive dysfunction as a first step to maximizing value in their unique situation.

- 1:00 pm **General Introduction and Introduction of Honorary Co-Chairs**
Rupert P. Amann, BioPore, Inc., State College, PA
Honorary Co-Chairs: Peter E. Lake, Roslin Institute, Edinburg, Scotland
Edward G. Buss, Pennsylvania State University, University Park, PA.
- 1:15 pm **Overview of the Challenges Facing the Industry**
David L. Pollock, Perdue Farms, Salisbury, MD
The primary breeder will face many challenges in the next decade as demand of unique and competitive poultry products grow. Examples will be provided, along with comments on how enhanced reproductive technologies might help satisfy some of these demands.
- 1:30 pm **Lessons for the Poultry Industry Gleaned from Experiences with Other Commodity Species**
Rupert P. Amann, BioPore, Inc., State College, PA
In contrast to other commodity animals, neither the poultry industry nor the academic community have devoted significant effort to determining how to maximize use of spermatozoa produced by elite males. A generalized overview of what types of studies are useful and the returns that could be expected will be provided.
- 2:00 pm **Retrospective Approaches when Faced with Flock Fertility Problems: Who Didn't Do It and Why?**
Graham J. Wishart, University of Abertay, Dundee, Scotland
A general overview of sperm-egg interaction will be provided with examples, for both fowl and turkeys, of how one would (a) monitor a flock in real time to identify inadequate fertilization in the field; and (b) run a prospective analysis on how to raise fertility of a flock.
- 2:40 pm **Prospective Approaches to Avoid Flock Fertility Problems: Who Is Unlikely to Do It, From the Male Perspective**
Annie M. Donoghue, USDA-ARS-GGPL, Beltsville, MD
Recent advances in methods for semen analyses allow evaluation of a male for reproductive potential before use. Examples of such tests, with examples for both fowl and turkeys, will be provided, along with comments on their practical application.
- 3:20 pm **Break**

- 3:40 pm **Genetic Correlates of Reproductive Traits to Features of Economic Importance: What Do You Give Up?**
Guy F. Barbato, Pennsylvania State University, University Park, PA
Ultimate success in the poultry industry demands solutions to problems that require minimal labor costs, often derived from exploitation of the genetic make up of the elite males selected for use. Results of studies on the correlated responses of reproductive traits with features of more obvious and immediate economic return will be presented along with speculation as to what might be possible.
- 4:20 pm **Optimizing Delivery of Genetic Merit in Subtropical Climates Through Advanced Reproductive Technologies**
Harpal Singh, Harmann Farms Pvt. Ltd., Hyderabad, India
Growth of the poultry industry in tropical climates presents unique challenges. Relatively low labor costs allow consideration of management strategies not possible in other parts of the world, but climatic conditions force a careful choice between optimized growth and other features, such as reproductive performance. Examples and suggested approaches will be provided.
- 5:00 pm **Summary of Challenges for the Future**
Roy H. Hammerstedt, Pennsylvania State University / BioPore, Inc., State College, PA
A brief history of the challenges that have been successfully met over the past century will be provided, with comments on the growing importance of enhanced reproductive performance. The presentations of Wishart, Donoghue, and Barbato will be put into perspective with the challenges set forth by Pollock and Singh, from the perspective of the primary breeder and producer, respectively.
- 5:30 pm **Close of Symposium**

Reducing The Environmental Impact of Poultry Production: Focus on Phosphorus

Tuesday, August 4, 1:00 pm - 3:00 pm
Room Q

Chair: William Huff, USDA/ARS/PPSRU

- 1:00 pm Phosphorus: An Environmental Concern
Andrew Sharpley, USDA/ARS/PS&WMR
- 1:30 pm Phosphorus: A Rate Limiting Nutrient in Surface Waters
David Correll, Smithsonian Environmental Research Center
- 2:00 pm Nutritional Approaches to Reducing Phosphorus Excretion
Park Waldroup, University of Arkansas
- 2:30 pm Reducing Phosphorus Runoff and Improving Poultry Production with Alum
Philip A. Moore, Jr., USDA/ARS/PPPSRU

Effective Poultry Programming in the Next Century

Tuesday, August 4, 3:30 pm - 6:00 pm
Room S

Chair: Dan L. Cunningham, University of Georgia

- 3:30 pm Introduction
Rich Reynnells, USDA
- 3:40 pm User Fees for Land Grant Universities Activities
Nick Sparks, Scottish Agricultural College
- 4:15 pm Balancing Research Programs: Applied and Basic
Jerry Cherry, University of Georgia, and Charles Beard, U.S. Poultry and Egg Association
- 5:15 pm Innovative Applications of Distance Education
Janet Poley, University of Nebraska and President of ADEC

Program

Sunday, August 2, 1998, 7:00 pm
Presidents Hall

General Session

Chair: *H. L. Classen*, University of Saskatchewan
President, Poultry Science Association

Call to order:

D. D. Bell, First Vice President, Poultry Science Association

Opening Session Speaker:

Introduction

H. S. Siegel

Applications Driven Science: Science's Future

Rustum Roy

Announcements and Instructions:

W. D. Weaver, Jr., Chair Host Committee

W. E. Huff, General Program Chair

Instructions to Those Making Presentations:

Oral presentations: Please provide slides to the projectionist in the room in which the talk will be presented prior to the start of the session or during the intermission. Slide sets should be numbered and arranged in their presentation sequence. Slide sets and/or slide trays should be labeled with the presenting author's name, presentation number, and time. Personal carousel trays (Kodak-80) are preferable but are not essential. Slides may be previewed in Rooms J-2 and T-7.

Poster presentations: Posters should be set up in Dean's Hall as early as possible in the morning or afternoon for each session. Thumb tacks or velcro may be used to mount posters on the poster boards provided. The formal presentation time, during which the authors must be present, is 10:00 am to 12:00 noon for both Monday and Tuesday morning sessions and 3:00 to 5:00 pm for the Monday afternoon session. **All posters must be removed promptly at the close of each session.**

This program and the Abstracts of papers presented at this meeting are available on the PSA website:
<http://www.psa.uiuc.edu>

Monday, 8:00 AM
ENVIRONMENT AND MANAGEMENT
Broilers

Room Q

Chair: Jesse Grimes, *North Carolina State University*

- 8:00 1 Effect of the Clubbed Down Feathering Abnormality on Broiler Chick Growth and Carcass Characteristics. D. R. Korver* and K. A. Thorsteinson, Department of Agricultural, Food and Nutritional Science, University of Alberta.
- 8:15 2 Effect of Sex Separate or Mixed Rearing of Pullets and Cockerels on Broiler Uniformity. C. Bennett* and K. Schwean, Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK, Canada S7N 5B5.
- 8:30 3 Influence of Early Skip-a-Day Feed Removal on Male and Female Broiler Performance. R. J. Lien*, J. B. Hess, S. F. Bilgili, and W. A. Dozier, III, Department of Poultry Science, Auburn University, 36849.
- 8:45 4 Incidence of Ascites in Broilers in Response to Carbon Dioxide Concentrations. R. H. McGovern¹*, J. J. R. Feddes², M. J. Zuidhof¹, J. A. Hanson¹, F. E. Robinson², and I. Edeogu², ¹Alberta Agriculture, Food and Rural Development, 7000-113 Street, Edmonton, Alberta, Canada, T6H 5T6, and ²Agricultural, Food, and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada, T6G 2P5.
- 9:00 5 Dual-Effect of Selenium-Yeast on Ascites and Aflatoxicosis Reduction in Broiler Chickens. V. G. Stanley*¹, C. Gray¹, and W. F. Krueger², ¹Prairie View A&M University, Texas A&M University System, Prairie View, TX ²Poultry Science Department, Texas A&M University, College Station.
- 9:15 6 Effects of Fumonisin B₁ in broilers and turkeys fed dietary treatments to market age. J. Broomhead*, D. Ledoux, A. Bermudez, and G. Rottinghaus, *Fusarium* Poultry Research Laboratory, University of Missouri, Columbia.
- 9:30 7 Cotton Gin Trash as an Alternative Litter Material for Broilers. R. K. Bramwell*¹ and M. J. Bader², ¹ Department of Poultry Science ² Department of Biological and Agricultural Engineering, The University of Georgia-Tifton.
- 10:15 8 Evaluation of Clay-based Litter Amendments to Reduce Ammonia Volatilization from Broiler Litter. G. W. Malone*¹, J. H. Martin, Jr.¹, and D. R. Taylor², ¹University of Delaware, Georgetown, and ²Oil-Dri Corporation of America, Vernon Hills, IL.
- 10:30 9 Effects of Lighting Regime and Feed Restriction for Various Durations on Growth Performance, Leg Abnormalities and Hemo-stress Response of Broilers. K. V. Vo, C. Burgess, N. A. Adefope, C. Catlin, Jr., and T. Wakefield, Jr., Cooperative Agricultural Research Program Tennessee State University, Nashville, TN 37209.
- 10:45 10 Influence of different lighting programmes on broiler performance and carcass yield. J. H. van Middelkoop and J. van Harn, Center for Applied Poultry Research PO Box 31 7360 AA Beekbergen Netherlands.
- 11:00 11 Predicting Broiler Performance at Different Temperatures. J. D. May*, B. D. Lott, and J. D. Simmons, USDA, Agricultural Research Service, South Central Poultry Research Laboratory, Mississippi State, MS 39762-5367.

- 11:15 12 Effective Air Temperature for Broilers. B. D. Lott*, J. D. May, and J. D. Simmons, USDA, Agricultural Research Service, South Central Poultry Research Laboratory, Mississippi State, MS 39762-5367.
- 11:30 13 Heat and Moisture Production of Broilers during Transportation: A Whole-Vehicle Direct Calorimeter. M. A. Mitchell^{1*}, P. J. Kettlewell², R. P. Hoxey², and M. G. MacLeod¹, ¹Roslin Institute (Edinburgh), Roslin, Midlothian, EH25 9PS, UK, ²Silsoe Research Institute, West Park, Silsoe, Bedfordshire, MK45 4HS, UK.
- 11:45 14 Effect of Brooding Temperature on Broiler Performance Parameters and Incidence of Ascites. A. H. Nilipour¹ and G. D. Butcher², ¹Grupo Melo, S.A. R & D. P. O. Box 333, Panama 1, Rep. of Panama ²University of Florida, College of Veterinary Medicine, Box 100136, Gainesville, FL.

Monday, 9:00 AM GENETICS

Room P

Chair: Tom Savage, *Oregon State University*

- 9:00 15 Telomere abundance in the chicken genome. M. E. Delany* and A. B. Krupkin, Department of Animal Science, University of California, Davis.
- 9:15 16 Mitochondrial DNA Variation among Broiler Breeder Dam Lines and Red Junglefowl Accessions. R. Okimoto* and G. Hamby, Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 9:30 17 Ribosomal DNA genotypes and nucleolar phenotypes of v-src initiated tumors in 6.B congenic chickens. M. E. Delany^{*1}, V. Gurel¹, and R. L. Taylor, Jr.², ¹Department of Animal Science, University of California, Davis CA 95616 and ² Department of Animal and Nutritional Sciences, University of New Hampshire, Durham.
- 10:15 18 Identification of an MHC Class II-like System Located Outside the Classical MHC-bearing Chromosome in the Chicken. N. Lakshmanan^{*1}, M. E. Delany², and M. G. Emara¹, ¹Dept. of Animal and Food Sciences, Univ. of Delaware, Newark, and ²Dept. of Animal Science, Univ. of California, Davis.
- 10:30 19 Variant Alleles at the Late-Feathering Locus in Chickens. A. Chaudhry* and R. Okimoto, Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 10:45 20 The Effect of Growth Factors on the Culture of Avian Blastodermal Cells. K. L. Woods^{1*}, H. Tsai², D. N. Foster³, and R. J. Etches¹, ¹Department of Animal and Poultry Science, University of Guelph, Guelph, Ontario, Canada N1G 2W1 ²USDA-ARS, Agricultural Research Service, Avian Disease and Oncology Laboratory, 3606 East Mount Hope Road, East Lansing, Michigan 48823 ³Department of Animal Science, University of Minnesota, St. Paul, Minnesota 55108.
- 11:00 21 PCR Analysis of Chicken Growth Hormone Gene Polymorphism. W. Yung, C. Chan, and F. Leung, Department of Zoology, University of Hong Kong, Hong Kong.
- 11:15 22 The Tuskegee Turkey Genome Project: Progress and Current Status. S. N. Nahashon^{*1}, L. Shi¹, P. Drummond¹, R. Hamilton¹, Y. Song¹, H.-B. Huang¹, E. J. Smith¹, C. Teuscher², M. Hsei³, and R. Zahorchak³, ¹Tuskegee University, Tuskegee, AL, ²University of Illinois, Urbana-Champaign, ³Research Genetics, Huntsville, AL.

Monday, 8:15 AM
NUTRITION A
Ingredients

Room R

Chair: Wilhelm Guenter, *University of Manitoba*

- 8:15 23 Effect of Corn Test Weight, Feed Form, and Formulation Type on Broiler Chick Performance, Carcass Composition, and Corn Apparent Metabolizable Energy. H. L. Stilborn^{1*}, D. W. Rice¹, and J. L. McNaughton², ¹Optimum Quality Grains LLC, Des Moines, IA 50322 ²PARC Institute, Easton MD 21601.
- 8:30 24 Low Phytic Acid Corn Improves Performance and Bone Mineralization in Chicks. Y. C. Li^{1*}, D. R. Ledoux¹, T. L. Veum¹, V. Raboy², and D. S. Ertl³, ¹ Department of Animal Sciences, University of Missouri, Columbia, ²USDA/ARS, Aberdeen, ID and ³Pioneer Hi-Bred International, Johnson, IA.
- 8:45 25 Effectiveness of High Oil Corn (HOC) in Summer Broiler Feeds. N. Rand*, Y. Noy, A. Dvorin, and S. Viola, Miloubar Feed Mill, Mobile Psot Ashrat, Israel, 25201.
- 9:00 26 The Effects of Sorghum Ergot on Broiler Performance. J. J. Fazzino, Jr.*¹, C. A. Bailey¹, M. S. Ziehr¹, M. Sattar¹, and G. Odvody², ¹Department of Poultry Science, Texas A&M University, College Station, ²Texas Agricultural Experiment Station, Corpus Christi, TX.
- 9:15 27 Carbohydrate-Binding and Agglutinating Lectins in Raw and Processed Soybean Meals. D. D. Maenz*, G. I. Irish, and H. L. Classen, Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK, S7H 0Y1, Canada.
- 9:30 28 Comparison of Soybean Meal Sources in Broilers Fed Normal and Low Protein Diets. R. A. Swick^{1*} and S. Srinongkote^{2*}, ¹American Soybean Assn, Singapore ²Bangkok Animal Research Farm.
- 10:15 29 Price, Cost Conditions and Production Response Under Which Peanut Meal is a More Profitable Feed Source Than Soybean Meal. E. F. Costa¹, B. R. Miller¹, and G. M. Pesti^{2*}, ¹Department of Agricultural and Applied Economics, The University of Georgia, Athens, Georgia 30602 ²Department of Poultry Science, The University of Georgia, Athens, Georgia 30602-2772.
- 10:30 30 Utilization of High Levels of Meat and Bone Meal in Broiler Diets. M. E. Drewyor* and P. W. Waldrop, Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.
- 10:45 31 Digestible Formulation of Male Turkey Diets when Utilizing High Levels of Ruminant By-product Meal. K. Baker* and J. Firman, Department of Animal Sciences, University of Missouri, Columbia.
- 11:00 32 Evaluation of the Effects of Processing Pressure and Time on Protein Quality of Meat and Bone Meals for Poultry. R. B. Shirley* and C. M. Parsons, ¹Department of Animal Sciences, University of Illinois, Urbana.
- 11:15 33 The Properties of Poultry Mortality Silage Prepared Using Feed Grade Phosphoric Acid. T. F. Middleton*, P. R. Ferket, and S. D. Crow, Department of Poultry Science, North Carolina State University, Raleigh.
- 11:30 34 Evaluation of Rendered Whole-Hen Meal as Broiler Feedstuff. A. M. Metwally^{1*} and B. R. Ramadan², ¹Animal Production Dept. Faculty of Agric.Assiut University. Assiut. Egypt ²Food Sci&Tech. Dept. Faculty of Agric.Assiut University, Assiut, Egypt.
- 11:45 35 Performance and Carcass Quality of Commercial Broilers as Affected by Supplementation of Different Levels of Rendered Whole-Hen Meal. A. M. Metwally, Animal Production Dept. Faculty of Agriculture Assiut University, Assiut, Egypt.

Monday, 8:30 AM
NUTRITION B
Minerals/Energy

Room S

Chair: William Saylor, *University of Delaware*

- 8:30 36 Studies on the Possibility of Reducing the Daily Requirement of Laying Hens for Protein, P and Ca. K. Keshavarz, Department of Animal Science, Cornell University, Ithaca, NY.
- 8:45 37 Further Studies on the Possibility of Reducing the Daily Requirement of Laying Hens for Protein, P, and Ca. K. Keshavarz, Department of Animal Science, Cornell University, Ithaca, NY.
- 9:00 38 Retainable Phosphorus Requirements for Broilers. K. L. Leske* and C. N. Coon, Department of Poultry Science, University of Arkansas, Fayetteville.
- 9:15 39 Inadequate Phosphorus Will Increase Pulmonary Hypertension-Ascites in Cold-Exposed Male Broilers. J. D. Garlich*, S. Auman, and H. Y. Shin, Department of Poultry Science, North Carolina State University, Raleigh, NC.
- 9:30 40 Foot Ash as a Parameter to Assay Bone Mineralization. A. Mendez* and N. Dale, Department of Poultry Science, University of Georgia, Athens, GA 30602.
- 10:15 41 Effect of Providing Organic Selenium and Chromium as Yeast in Laying Hen Diets on Nutrient Composition of Eggs. N. D. Paton*¹, A. H. Cantor¹, M. J. Ford¹, B. T. Slaugh², A. F. Rizvi², and T. P. Karnezos³, ¹Department of Animal Sciences, University of Kentucky, Lexington, ²Eggland's Best, Inc., King of Prussia, PA, ³Alltech, Inc., Nicholasville, KY.
- 10:30 42 Corn Hybrid and Bird Maturity Affect Apparent Metabolizable Energy Values. N. E. Collins¹*, E. T. Moran, Jr.¹, and H. L. Stilborn², ¹Poultry Science Department, Auburn University, AL 36849 ²Optimum Quality Grains, Des Moines, IA 50322..
- 10:45 43 The Availability of Dietary Energy from Wheat or Corn Based Diets in Growing Turkeys. M. E. Persia* and M. S. Lilburn, Department of Animal Sciences, The Ohio State University, OARDC.
- 11:00 44 Differences Between True and Apparent Metabolizable Energy of High-fiber Diets. M. Francesch*¹, K. Bernard², and J. M. McNab², ¹Institut de Recerca i Tecnologia Agroalimentaries. Centre Mas Bove. Apartat 415, 43280 Reus, Spain. ²Roslin Institute (Edinburgh) Roslin, Midlothian, EH25 9PS Scotland.
- 11:15 45 Energy metabolism parameters and composition of body weight gain of broilers fed mash or pelleted diets at two metabolizable energy levels. J. L. Lecznieski, A. M. Kessler, and A. M. Penz, Jr.*, Departamento de Zootecnia da Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brasil 91540-000.
- 11:30 46 The TME_n of Untreated and Water or Acetic Acid-Soaked Vetch and Ervil seeds. M. T. Faran¹, G. W. Barbour², M. G. Uwayjan¹, and V. M. Ashkarian¹, ¹Animal Science Department, Faculty of Agricultural and Food Sciences, American University of Beirut, P.O.Box:11-0236, Beirut, Lebanon,²Animal Production Department, Lebanese Agricultural Research Institute, Tel Amaara, Lebanon.

Monday, 9:00 AM PATHOLOGY

Room E

Chair: Mo Saif, *Ohio State University*

- 9:00 47 Detection of Infectious Bursal Disease Virus RNA in Formalin-Fixed, Paraffin-Embedded Tissues by Polymerase Chain Reaction, In Situ, Nonisotopic Hybridization. J. Giambrone¹ and X. Liu², Department of Poultry Science Alabama Agricultural Experiment Station Auburn University, AL 36849-5416.
- 9:15 48 Characterization of Four Serologic Variant Infectious Bursal Disease Virus (IBDV) Isolates by Restriction Length Polymorphism (RFLP) and Monoclonal Antibody (Mab) Testing. T. V. Dormitorio^{*1}, J. J. Giambrone¹, and J. Ignjatovic², ¹Department of Poultry Science, Auburn University, Auburn, AL, ²CSIRO Division of Animal Health, Australian Animal Health Laboratory, Private Bag 24, Geelong, Victoria 3213 Australia.
- 9:30 49 Effects of Newcastle Disease Virus(NDV) and Infectious Bursal Disease Virus (IBDV) Vaccine on Performance of Broiler Chicks. K. S. Ryu¹, J. T. Kwon², T. J. Kim², and H. S. Song², ¹Department of Animal Science, Chonbuk National University, Chonju, Republic of Korea 561-756 ²Department of Veterinary Medicine, Chonbuk National University, Chonju, Republic of Korea 561-756.
- 10:15 50 The Reovirus Escape From the Immune System: Detection and Isolation in the Brains of Spafas Chicks Following Inoculation of Avian Reovirus into the Small Intestine. E. L. Read-Connole* and W. J. Kuenzel, Molecular and Cellular Biology Program, Department of Animal & Avian Sciences, University of Maryland, College Park.
- 10:30 51 Reproduction of Proventricular Lesions Using Viral and Bacterial Isolates from Broilers with Proventriculitis. Q. Zheng^{1*}, G. R. Huff¹, W. E. Huff¹, J. M. Balog¹, N. C. Rath¹, L. A. Newberry², and J. K. Skeeles², ¹USDA/ARS/PPPSRU, University of Arkansas, Fayetteville, AR 72701, ²Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 10:45 52 Effect of Hen Age at Inoculation on Isolation Recovery Rate of F Strain *Mycoplasma gal-lisepticum*. S. L. Branton^{1*}, G. T. Pharr², B. D. Lott¹, J. D. May¹, and W. R. Maslin², ¹USDA, Agricultural Research Service, South Central Poultry Research Laboratory, Mississippi State, MS 39762-5367, and ²College of Veterinary Medicine, Mississippi State University, Mississippi State, MS 39762.
- 11:00 53 A Statistical Model for Assessing Bacterial Colony Selection Strategies: A Case Study of *Escherichia Coli* and Avian Cellulitis. R. S. Singer^{*1}, J. S. Jeffrey¹, W. O. Johnson², D. C. Hirsh¹, R. P. Chin¹, and T. E. Carpenter¹, ¹School of Veterinary Medicine, University of California, Davis ²Division of Statistics, University of California, Davis.
- 11:15 54 Spatial Heterogeneity of *Escherichia Coli* Isolated from Avian Cellulitis Lesions in Broilers. R. S. Singer*, J. S. Jeffrey, C. L. Cooke, D. C. Hirsh, R. P. Chin, and T. E. Carpenter, School of Veterinary Medicine, University of California, Davis.
- 11:30 55 Application of an In Vivo Inoculation Model for Comparing Virulence of Cellulitis-Derived *Escherichia Coli* in Broiler Chickens. J. S. Jeffrey^{1*}, R. S. Singer¹, and R. P. Chin^{1,2}, ¹School of Veterinary Medicine, University of California-Davis, ²California Veterinary Diagnostic Laboratory System.
- 11:45 56 The Use of an Improved *in vivo* Model for Avian Cellulitis in Broiler Chickens for the Assessment of the Significance of Scratches in Avian Cellulitis. K. S. Macklin*, R. A. Norton, and B. L. McMurtrey, Dept. of Poultry Science, Auburn University, Auburn, AL 36849-5416.

Monday, 8:30 AM
PHYSIOLOGY
Reproduction

Room H

Chair: Wayne Bacon, *Ohio State University*

- 8:30 57 Dopamine Inhibits Prolactin Secretion Induced by Vasoactive Intestinal Peptide via D2 Dopamine Receptors in the Turkey Pituitary. O. M. Youngren¹, Y. Chaiseha², and M. E. El Halawani^{*2}, ¹Dept. of Ecology, Evolution & Behavior and ²Dept. of Animal Science, University of Minnesota, St. Paul.
- 8:45 58 Serotonergic Stimulation of Avian Prolactin Secretion Requires an Intact Dopaminergic System. O. M. Youngren¹, Y. Chaiseha², and M. E. El Halawani^{*2}, ¹Dept. of Ecology, Evolution & Behavior, and ²Dept. of Animal Science, University of Minnesota, St. Paul.
- 9:00 59 The Use of Microdialysis to Determine the Effects of Serotonin, Stress, and Light on Monoamines in the Turkey Hypothalamus. G. R. Pitts* and M. E. El Halawani, Department of Animal Science, University of Minnesota, St. Paul.
- 9:15 60 Vasoactive Intestinal Peptide/Peptide Histidine Isoleucine Gene Expression in the Female Turkey During the Reproductive Cycle. Y. Chaiseha^{*1} and M. E. El Halawani¹, ¹Department of Animal Science, University of Minnesota, St. Paul.
- 9:30 61 Nest-deprivation of Incubating Turkey Hens is Associated with a Decline in Proliferating Cell Nuclear Antigen in the Anterior Pituitary Gland. R. Ramesh^{*1}, W. J. Kuenzel², and J. A. Proudman¹, ¹Germplasm and Gamete Physiology Laboratory, USDA, ARS, Beltsville, MD ²Department of Animal and Avian Sciences, University of Maryland, College Park.
- 10:15 62 Effects of Photoperiods on Reproduction and Plasma Concentrations of Luteinizing Hormone (LH) and Estradiol (E) in Turkey Hens from Hatch to 60 Wk of Age. J. Yang and W. L. Bacon, Department of Animal Sciences, The Ohio State University, OARDC, Wooster.
- 10:30 63 Active Immunization of Broiler Breeder Hens with a Recombinant Chicken Inhibin Fusion Protein Enhances Egg Lay. D. G. Satterlee^{*1}, G. G. Cadd¹, J. D. Moreau¹, S. A. Castille¹, L. H. Parker¹, and W. C. Fioretti², ¹Applied Animal Biotechnology Laboratories, Dept. of Poultry Science, LAES, LSU Ag Center, Baton Rouge, LA ²AgriTech Labs, Inc., Coppell, TX.
- 10:45 64 Alteration of the Follicular Hierarchy by Active Immunization of Broiler Breeder Hens with a Recombinant Chicken Inhibin Fusion Protein. G. G. Cadd^{*1}, D. G. Satterlee¹, F. Moharer¹, S. A. Castille¹, L. H. Parker¹, and W.C. Fioretti², ¹Applied Animal Biotechnology Laboratories, Dept. of Poultry Science, LAES, LSU Ag Center, Baton Rouge, LA, ²AgriTech Labs Inc., Coppell, TX .
- 11:00 65 Effects of Body Weight and Feeding Level during Sexual Maturation on Carcass Traits, Ovarian Morphology, and Plasma Hormone Profiles in Broiler Breeder Hens. R. A. Renema^{1*}, F. E. Robinson¹, J. A. Proudman², M. Newcombe³, and R. I. McKay³, ¹Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB., T5G 2P5, ²U.S.D.A./A.R.S., Beltsville, MD., 20705, and ³Shaver Poultry Breeding Farms Ltd., Cambridge, ON., N1R 5V9.
- 11:15 66 Changes in Thyrotrophs and Gonadotrophs Within the Pituitary Gland During Induction of Advanced Gonadal Development by Sulfamethazine. W. J. Kuenzel^{*1}, R. Ramesh², T. E. Porter¹, and J. A. Proudman², ¹Department of Animal and Avian Sciences, University of Maryland, College Park, ²Germplasm and Gamete Physiology Laboratory, USDA, ARS, Beltsville, MD.
- 11:30 67 Production and Characterization of Monoclonal Antibodies to Chicken Follicle Stimulating Hormone. J. A. Proudman^{*1}, F. Vandesande², and L. R. Berghman², ¹Germplasm & Gamete Physiology Laboratory, USDA-ARS, Beltsville, MD, ²Laboratory of Neuroendocrinology and Immunological Biotechnology, Catholic University of Leuven, 3000 Leuven, Belgium.

Monday 8:00 AM

PROCESSING AND PRODUCTS

Room F

Chair: Pat Curtis, *North Carolina State University*

- 8:00 68 Quality of Stored Eggs: Temperature and Relative Humidity Effects. M. J. Zuidhof*, P. R. Goerzen, and P. A. Day, Animal Industry Division, Alberta Agriculture, Food and Rural Development, #204 7000-113 St., Edmonton, AB T6H 5T6.
- 8:15 69 Salmonella Growth in Egg Components as Affected by Ratio of Yolk:Albumen. L. A. Hughes* and D. E. Conner, Poultry Science Department and Alabama, Agricultural Experiment Station, Auburn, University, AL 36849-5416.
- 8:30 70 Salmonella Growth in Eggs as Affected by Storage Time and Site of Inoculation. L. A. Hughes* and D. E. Conner, Poultry Science Department, and Alabama Agricultural Experiment Station, Auburn University, AL 36849.
- 9:00 71 Influence of Temperature and the Level and Location of Contamination on the Growth of *Salmonella enteritidis* in Experimentally Inoculated Eggs. R. K. Gast*, Southeast Poultry Research Laboratory, USDA-ARS, Athens, GA.
- 9:15 72 Microbiological Integrity of the Contents of CO₂ Cooled Commercially Processed Shell Eggs. K. E. Anderson¹*, P. A. Curtis², F. T. Jones³, and L. A. Hughes⁴, ¹Poultry Sci. Dept. and ²Food Sci. Dept., North Carolina State University, Raleigh, NC 27695, ³Poultry Sci. Dept., University of Arkansas, Fayetteville, AR 72701, ⁴Dept. Poultry Sci., Auburn University, Auburn, AL 36849.
- 9:30 73 Spraying Shell Eggs With a Peroxidase-Catalyzed Sanitizer is an Effective Method in the Reduction of Surface Aerobic Bacteria and *Salmonella typhimurium*. S. R. McKee¹, Y. M. Kwon², J. B. Carey², A. R. Sams², and S. C. Ricke², ¹Department of Food Science & Technology, University of Nebraska-Lincoln, Lincoln, NE 68583-0919 ²Department of Poultry Science, Texas A&M University, College Station TX 77843-2472.
- 10:15 74 Comparison of Egg Sanitizer Efficacy on Early versus Late Stationary Phase *Salmonella typhimurium* Cultures. K. D. Knape^{*1}, Y. M. Kwon¹, S. R. McKee², J. B. Carey¹, and S. C. Ricke¹, ¹Department of Poultry Science, 101 Kleberg Center, Texas A&M University, College Station, TX 77843-2472 ²Department of Food Science & Technology, University of Nebraska-Lincoln, NE 68583-0919.
- 10:30 75 Hydrogen Peroxide Applied with Vacuum and a Surfactant to Eliminate *Salmonella* From Hatching Eggs. N. A. Cox, M. E. Berrang, and R. J. Buhr, USDA-ARS Russell Research Center, Athens GA.
- 10:45 76 Efficacy of Multiple Dips to Eliminate *Salmonella* from Hatching Eggs. N. A. Cox*, M. E. Berrang, and J. S. Bailey, ¹USDA-ARS-Russell Research Center, Athens, GA.
- 11:00 77 Incidence of *Salmonella* in Processed Broilers Following Transportation in Contaminated Coops. C. B. Wakefield* and D. E. Conner, Poultry Science Department, Alabama Agricultural Experiment Station, Auburn University, AL 36849.
- 11:15 78 The Spray Application of Poultry Carcasses with the Sanova™ Food Quality System Reduces the Load of Foodborne Pathogens. C. S. Schasteen¹*, K. Kemp², B. D. Murphy¹, J. Dong¹, R. L. Powell¹, and O. A. Oyarzabal¹, ¹Novus International, St. Louis, MO ²Alcide Corporation, Seattle, WA.
- 11:30 79 Coating chicken drumsticks with chitosan film solutions. P. L. Dawson*, R. V. Orr, and I.Y. Han, Clemson University.

- 11:30 80 A Regression Equation for Rapidly Determining the Concentration of *Escherichia coli* (*E. coli*) on Chicken, Beef, Pork, Milk, and Fish. A. Edmiston and S. M. Russell, Department of Poultry Science, The University of Georgia, Athens, GA 30602-2772.
- 11:45 81 Feasibility of Bioprocessing of Feather and other Keratins: Isolation of Keratin-Degrading Fungus and *In Vitro* Determination of the Activity of Extracellular Keratinolytic Protease. N. A. Al-Sane, A. A. Al-Musallam, S. Al-Zarban, and A. A. Onifade*, Department of Biological Sciences, Kuwait University, P. O. Box 5969, Safat 13060, Kuwait.

Monday AM POSTERS

Deans Hall

Environment and Management

- 82 Inclusion of Chili Pepper Oleoresin in Layer/Breeder Diet: An Evaluation of Egg Production, Reproductive Performance and Sensory Properties of Eggs. R. E. Austic*¹, J. A. Dunn², J. C. Keene¹, J. M. Regenstein³, and D. Weilmeier³, ¹Department of Animal Science, Cornell University, Ithaca, NY, ²Snyder Seed Corporation, Amherst, NY, ³Department of Food Science, Cornell University, Ithaca, NY.
- 83 Influence of Vitamin C on Heat Shock Protein 70 Expression in Five-Week-Old White Leghorn Chickens Subjected to Acute Heat Stress. K. Z. Mahmoud* and F. W. Edens, Department of Poultry Science, North Carolina State University, Raleigh.
- 84 Effect of Aviguard® Administration on the Performance of Broiler Chicks Subjected to Heat Stress and Coccidiosis. J. S. McKee¹, K. W. Koelkebeck*¹, P. C. Harrison¹, C. Hofacre², and R. Froyman², ¹Department of Animal Sciences, University of Illinois, Urbana, ²Bayer Corporation, Watkinsville, GA.
- 85 Evaluate The Effect Of Feeder Height On Broiler Economic Performance Parameters. A. H. Nilipour¹ and G. D. Butcher², Grupo Melo, S.A. R & D, P. O. Box 333, Panama 1, Rep. of Panama University of Florida, College of Veterinary Medicine, Box 100136, Gainesville, FL.
- 86 *In ovo* peptide YY (PYY) administration and its effects on the conductive function of the yolk stalk during yolk uptake in broiler chicks. E. D. Peebles^{1*}, W. J. Croom, Jr.³, I. L. Taylor⁴, W. R. Maslin², S. Whitmarsh¹, and L. R. Daniel³, ¹Poultry Science Department, Mississippi State University, Mississippi State, MS 39762 ²College of Veterinary Medicine, Mississippi State University, Mississippi State, MS 39762 ³Poultry Science Department, North Carolina State University, Raleigh, NC 27695 ⁴Medical University of South Carolina, Charleston, NC 29425.
- 87 Effects of halofuginone and monensin when given with bambarmycins or bacitracin methylene disalicylate upon the control of coccidiosis in turkeys. H.D. Chapman¹, J. Sandstrom², S.W. Breeding¹, and S.W. Breeding¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Hoechst Roussel Vet Co., 30 Independence Boulevard, P.O. Box 4915, Warren, NJ 05050-4915.
- 88 Changes in the Intestinal Bacteria of Turkeys After Removal of the Anticoccidial, Monensin, and Addition of Growth-promoting Antibiotics to the Diet. S. E. Craven*¹, T. S. Cummings², N. A. Cox¹, and N. J. Stern¹, ¹USDA-ARS-RRC, Athens, GA 30604-5677 ²Pfizer Animal Health, White Sulphur Springs, WV 24986.
- 89 Effect of Some Heavy Metal Pollutants on the Performance and Immune System of Chicks. A. Hassan¹, R. Saleh^{1*}, M. Sobih¹, S. Wilson², and P. Reddy^{2*}, ¹Dept. Of Animal Hygiene, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt, and ²Dept. Of Pathobiology, School of Veterinary Medicine, Tuskegee University, Tuskegee AL. 36088.
- 90 Effect of Feed Withdrawal on the Bacterial Flora, pH, and Weights of the Ceca of Chickens. A. Hinton, Jr.*¹, R. J. Buhr, and K. D. Ingram, PPMQ-ARS-USDA, Russell Research Center, Athens, GA 30604.

Extension-Instruction

- 91 Economic Importance of Minnesota's Poultry Industry. G. W. Morse¹, S. L. Noll^{2*}, and I. Ha¹, ¹Department of Applied Economics, ²Department of Animal Science, St. Paul, Minnesota 55108.
- 92 Effects of Bio-Mos on Aflatoxicosis, Serum, Liver, And Egg Cholesterol And Egg Production in Chickens. V. G. Stanley^{*1}, C. Gray¹, and Y. Park¹, Prairie View A&M University, Texas A&M University System, Prairie View, Texas.

Immunology

- 93 Lymphocyte Profiles in Blood and Tumor of Rous Sarcoma Virus Infected Arkansas Rous Sarcoma Regressor and Progressor Chickens. M. D. Headrick*, N. B. Anthony, T. K. Bersi, and G. F. Erf, Department of Poultry Science, University of Arkansas, Fayetteville.
- 94 Chronic Heat Stress Alters Lymphocyte Profiles in Blood, Thymus, and Spleen in Male Broiler Chickens. J. L. M. Morgan, T. K. Bersi*, J. D. Kirby, and G. F. Erf, Dept. of Poultry Science, University of Arkansas, Fayetteville.
- 95 MHC Class II Expression by T Cells Present in Growing Feathers from Smyth Line Chickens with Vitis. X. Wang^{1*}, J. R. Smyth, Jr.², T. K. Bersi¹, and G. F. Erf¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Department of Veterinary and Animal Sciences, University of Massachusetts, Amherst, MA 01003.
- 96 3-Hydroxy-3-methylbutyrate (HMB) fed in the water enhances immune response in young broilers. P. Ostaszewski^{1*}, A. K. Siwicki², Z. Skrzek¹, B. Balasinska¹, J. C. Fuller, Jr.³, and S. Nissen⁴, ¹Dept. of Animal Physiology, Warsaw Agricultural Univ., Warsaw, Poland ²Dept. of Epizootic with Clinic of Infection Diseases, Olsztyn, Poland ³Metabolic Technologies Inc., Ames, IA, ⁴Iowa State Univ., Ames, IA.
- 97 Changes in glutathione levels and glutathione-dependent enzymes during immune organ development in Cornell K strain chickens. R. A. Hemendinger* and S. E. Bloom, Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University, Ithaca, NY.
- 98 Effect of Dietary Arginine on the Cellular Response of Chickens to Infectious Bronchitis. J. Lee^{*1,3}, R. E. Austic², S. A. Naqi¹, K. A. Golemboski^{1,3}, and R. R. Dietert^{1,3}, ¹Department of Microbiology and Immunology, College of Veterinary Medicine, ²Department of Animal Science, College of Agriculture and Life Sciences and ³Institute for Comparative and Environmental Toxicology, Cornell University, Ithaca, New York.
- 99 Effect of Triiodothyronine on Abdominal Exudate Cell Responsiveness to IFN-gamma. M. D. Gober and J. A. Marsh*, Department of Microbiology and Immunology, C5-103 VMC, College of Veterinary Medicine, Cornell University, Ithaca, NY.
- 100 A Comparative Study of Thyroid and Immune Response Activity in Sex Linked Dwarf and Normal Broiler Breeder Chicks.. A. M. M. Atta^{*1}, S. S. Siam, and F. M. Nosseir.³, Animal Production Department, Faculty of Agriculture, Cairo University, Giza, Egypt..
- 101 A Study on Cellular Immunity of Chickens to Eimeria Maxima Infection. J. Hu^{**}, H. Zha, and J. Jiang, College of Veterinary Medicine , China Agricultural University, Beijing 100094, China.
- 102 Immunization of White Leghorn Chickens to Flagellin of Salmonella enteritidis Administered in Alginate Microspheres. R. E. Porter, Jr.* and N. P. Macri, Department of Pathobiology and Animal Disease Diagnostic Laboratory, Purdue University, West Lafayette, IN.
- 103 Passive Transfer of the Delayed-Type Hypersensitivity Reaction to Killed *S. aureus* by Splenic Lymphocytes. X. Y. Zhu^{*1}, R. E. Porter, Jr.², and P. Y. Hester¹, ¹Department of Animal Sciences and ²Animal Disease Diagnostic Laboratory, Purdue University, West Lafayette, IN.

- 104 Inability of *Campylobacter jejuni* exhibiting defective environmental stress responses to colonize the ceca of newly hatched chicks. R. L. Ziprin^{1*}, C. R. Young¹, M. E. Hume¹, L. H. Stanker¹, B. J. Kim², and M. E. Konkel², ¹USDA-ARS, Food Animal Protection Research Laboratory, College Station, TX 77845 ²Department of Microbiology, Washington State University, Pullman, WA 99164-4233.

Physiology

- 105 Broiler Breeder Survivors of Chronic Unilateral Pulmonary Artery Occlusion Produce F₁ Progeny that are Resistant to Pulmonary Hypertension Syndrome (PHS, Ascites) Induced by Cool Temperatures. R. F. Wideman, Jr.^{1*} and H. French², ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Hubbard ISA, Walpole, NH 03608.
- 106 Evaluation of Minimally Invasive Indices for Predicting Ascites Susceptibility in Three Successive Hatches of Broilers Exposed to Cool Temperatures. R. F. Wideman, Jr.^{1*}, T. Wing², Y. Kochera-Kirby¹, M. F. Forman¹, and C. A. Ruiz-Feria¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Cobb-Vantress, Inc., Rose, OK 74364.
- 107 Cardiac Output Increases in Proportion to Body Weight in 4, 5 and 6 Week Old Broilers. R. F. Wideman, Jr.*., Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 108 Hemodynamic Responses of Broilers to Intravenous Injections of Epinephrine. R. F. Wideman, Jr.*., Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 109 Thromboxane Mimics the Pulmonary but not Systemic Vascular Responses to Bolus HCl Injections. R. F. Wideman, Jr.*., P. Maynard, and W. G. Bottje, Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 110 Plasma Amino Acid Levels in Broilers with a Unilateral Pulmonary Arterial Clamp to Induce Pulmonary Hypertension Syndrome (PHS, ascites). C. A. Ruiz-Feria*, K. Beers, and R. F. Wideman, Jr., Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 111 Electrocardiographic Evaluation of Broilers Following Unilateral Occlusion of an Extrapulmonary Primary Bronchus. Y. Kochera-Kirby^{1*}, R. W. McNew², N. B. Anthony¹, J. D. Kirby¹, and R. F. Wideman, Jr.¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Agricultural Statistics laboratory, University of Arkansas, Fayetteville, AR 72701.
- 112 Electrocardiographic and Genetic Evaluation of Clinically Healthy Broilers and Giant Jungle Fowl Following Unilateral Bronchus Occlusion. Y. Kochera-Kirby^{1*}, N. B. Anthony¹, R. W. McNew², J. D. Kirby¹, and R. F. Wideman, Jr.¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701 ²Agricultural Statistics Laboratory, University of Arkansas, Fayetteville, AR 72701.
- 113 The Proliferative Capacity of Pulmonary Arterial Endothelial Cells From a Broiler and a Leghorn Chicken Line in Cell Culture. T. W. Odom^{*1}, W. M. Chilian², J. L. Patterson³, L. A. Martinez-Lemus¹, G. A. Ramirez¹, and J. S. Jeffrey⁴, Dept. of Poultry Science¹, Texas Agricultural Experiment Station, Dept. of Small Animal Medicine³, College Station, TX, Dept. of Physiology², Medical College of Wisconsin, Milwaukee, and Univ. Of California-Davis⁴, Tulare.
- 114 Endocrine and Metabolic Responses of the Chicken to an Intravenous Injection of Either Chicken (Cigf-Ii) or Human Insulin-Like Growth Factor-Ii (Higf-Ii). J. P. McMurtry*, G. Francis, T. Caperna, R. Vasilatos-Younken, R. Rosebrough, and D. Brocht, USDA, ARS, Growth Biology Lab, Beltsville, MD 20705, CSIRO-Division of Human Nutrition, Adelaide, South Australia 5000, and Dept. of Poultry Science, The Pennsylvania State University, University Park, PA 16802.
- 115 Leptin Expression in Broiler Chickens. C. M. Ashwell*, S. M. Czerwinski, and J. P. McMurtry, USDA, ARS, LPSI, Growth Biology Laboratory, Beltsville, Maryland 20705.

- 116 Clearance of DL-2HYDROXY-4-(Methylthio) Butanoic Acid (Hmb) by Broiler Liver *in vivo*. W. Bottje^{1*}, S. Wang¹, K. Beers¹, M. Vazquez-Anon², and P. McCullough², ¹Dept. of Poultry Science, Univ. of Arkansas Fayetteville, AR 72701, ²Novus International Inc. St. Louis, MO.
- 117 Melanocyte Development in the Culture of Neural Crest Cells of the Silky Fowl. S. Muroya^{*}, R. Tanabe, and K. Chikuni, Meat Science Laboratory, National Institute of Animal Industry, Kukisaki, Ibaraki, 305-0901, Japan.
- 118 Immunohistochemical Localization of the Sodium-Dependent Glucose Transporter (SGLT1) in the Turkey Small Intestine. S. Suvarna^{*}, V. L. Christensen, and J. N. Petite, Department of Poultry Science, North Carolina State University, Raleigh.
- 119 Estradiol implants prevent heat stress suppression of calcium uptake by laying hen duodenal cells. K. K. Hansen^{*} and M. M. Beck, Department of Animal Science, University of Nebraska-Lincoln.
- 120 Calcium transport in shell gland of heat-stressed hens with and without estrogen implants. K. K. Hansen^{*} and M. M. Beck, Department of Animal Science, University of Nebraska-Lincoln.
- 121 Effect of photoperiodic change on VIP and cGnRH-I in the male Japanese quail. R. Teruyama^{*} and M. M. Beck, Department of Animal Science, University of Nebraska-Lincoln.
- 122 In ovo Administration of Chicken Growth Hormone Alters Growth in the Postnatal Broiler Chick^{*} H. Kocamis, D. Keller, and J. Killefer, Division of Animal and Veterinary Sciences West Virginia University, Morgantown.
- 123 Evidence for mediation of the depressive effect of growth hormone (GH) on voluntary feed intake (FI) by neuropeptide Y (NPY) and monoamines. X. H. Wang^{*1}, J. R. Day², J. L. Beard³, Y. Zhou¹, and R. Vasilatos-Younken¹, ¹Poultry Science Department, ²Department of Biology, ³Department of Nutrition, Penn State University, State College.
- 124 Induction and Activation of JAK2 Protein Occur with Chronic Exposure to GH, Despite Lack of an Anabolic Response in Chicken Skeletal Muscle. Y. Zhou^{1*}, X. H. Wang¹, J. P. McMurtry², and R. Vasilatos-Younken¹, ¹Penn State University, University Park, PA 16802, ²USDA-ARS, Beltsville, MD 20705.
- 125 Evidence for the Presence of Relaxin-Like Factor mRNA in Avian Tissues. J. M. Wu, A. J. Davis, C. F. Brooks, and P. A. Johnson, Department of Animal Science, Cornell University, Ithaca, NY.
- 126 Inhibition of adipocyte differentiation *in vitro* by exposure to monoclonal antibodies against adipocyte plasma membranes from chick embryos. Y. J. Wu^{*1}, J. T. Wright², and A. L. Cartwright¹, ¹Poultry Science Department, Texas A&M University, College Station, ²Biology Department, Georgia Southwestern State University, Americus.
- 127 Embryonic Determinants of Production Characteristics in Poultry. C. M. Davis^{*1}, N. G. Zimmerman¹, D. L. Pollack², and M. A. Ottinger¹, ¹Department of Animal and Avian Sciences University of Maryland, College Park, ²Perdue Farms, Inc. Salisbury, MD.

Monday, 1:30 PM
ENVIRONMENT AND MANAGEMENT
Laying Hens and Byproducts

Room Q

Chair: Bruce Webster, *University of Georgia*

- 1:30 128 Effects of Floor Versus Cage Rearing on the Performance of White Leghorns. K. Lee and C. W. Moss, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71611.

- 1:45 129 Effects of Light Intensity and Strain on Carcass Traits, Ovarian Morphology, and Egg Production Parameters in Egg-Type Chickens. R. A. Renema*¹, F. E. Robinson¹, J. J. R. Feddes¹, M. J. Zuidhof², M. Newcombe³, and A. Kulenkamp³, ¹Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, ²Alberta Agriculture, Food, and Rural Development, Edmonton, AB, and ³Shaver Poultry Breeding Farms Ltd., Cambridge, ON.
- 2:00 130 Eggshell Quality of Old Commercial Layers on Eggshell 49. R. J. Balander^{1*}, C. Robbins², and R. J. Templeman¹, ¹Department of Animal Science, Michigan State University, East Lansing, MI 48824, ²Alltech Biotechnology, Inc., Nicholasville, KY 40356.
- 2:15 131 The Effects of Feeding the Direct-Fed Microbial, PrimaLac[®], on Growth Parameters and Egg Production in Table Egg White Leghorn Hens. G. S. Davis and K. E. Anderson, Department of Poultry Science, NC State University, Raleigh.
- 2:30 132 Domestic fowl become more tolerant of flock mates with increasing group size. I. Estevez, R. Newberry, and L. Keeling, 1) Dept. of Animal Hygiene, Swedish University of Agricultural Sciences, P.O. Box 345, 532 24 Skara, Sweden. 2) Center for the Study of Animal Well-Being, Washington State University, Pullman WA 99164-6520, USA. *Present address: Department of Animal and Avian Sciences, University of Maryland, College Park, USA..
- 3:15 133 Behavioral Changes of Laying Hens during and Induced Molt Fast. A. B. Webster, Department of Poultry Science, University of Georgia, Athens, GA 30602.
- 3:30 134 The Effect of Fermentation on pH, Microbial Pathogens, and Gas Production of Enzyme or Sodium Hydroxide Treated Poultry Mortalities. W. K. Kim* and P. H. Patterson, Department of Poultry Science, Pennsylvania State University, University Park.
- 3:45 135 Microbiological survey of poultry mortality disposal pits. D. P. Smith*, Department of Poultry Science, University of Georgia, Gainesville.
- 4:00 136 The Use of Poultry Litter to Enhance the Biodegradation of Petroleum Compounds. C. M. Williams*^{1,2}, J. L. Grimes², and R. L. Mikkelsen³, ¹Animal and Poultry Waste Management Center, ²Department of Poultry Science, North Carolina State University, Raleigh, and ³Department of Soil Science, North Carolina State University, Raleigh.
- 4:15 137 Effect of Sodium Hydroxide or Enzyme on Feather Digestion. W. K. Kim* and P. H. Patterson, Department of Poultry Science, Pennsylvania State University, University Park.

Monday, 1:30 PM
EXTENSION-INSTRUCTION

Room F

Chair: Lee Cartright, *Texas A&M University*

- 1:30 138 Animal Well Being: an Education Tract for the State 4H Senior Conference. A. J. Pescatore and G. L. M. Chappell, Department of Animal Sciences University of Kentucky, Lexington.
- 1:45 139 Operation Food Safety: Incorporation of Food Safety Training Into the Health Framework of the Arkansas Public School System. J. Marcy, J. Denton, S. Slaughter, and A. Waldroup, Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.
- 2:00 140 Interstate learning---a University of Nebraska-Lincoln/Kansas State University class project. M. M. Beck*¹ and J. C. Swanson², ¹University of Nebraska-Lincoln, ²Kansas State University, Manhattan.
- 2:15 141 The PSA Reference Database: An Overview of Publications in *Poultry Science*, 1921--1996. J. A. Cason^{1*} and J. F. Stephens², ¹Russell Research Center, ²The Ohio State University.
- 2:30 142 Effect of Protein on Growth and Carcass Yield of Emu. J. P. Blake* and J. B. Hess, Department of Poultry Science, Auburn University, AL 36849.

- 3:15 143 The Effect of Floor Space, Light Regimen, and Diet During Growing Period on Early Egg Size and Overall Production Performance. K. Keshavarz, Department of Animal Science, Cornell University, Ithaca, NY.
- 3:30 144 The Use of High Nutrient Density Diets for Broilers in Kuwait. A. Al-Nasser*, K. Holleman, A. Al-Saffar, H. Al-Khalaifa, S. Behbehani, A. Al-Haddad, and F. Al-Matrouq, Aridland Agriculture Department, Kuwait Institute for Scientific Research, P.O.Box 24885, Safat 13109, Kuwait.
- 3:45 145 Effect of Supplemental DL-Methionine and Vegetable Oil on Performance of Broilers Raised in Kuwait. A. Al-Nasser*, K. Holleman, A. Al-Saffar, H. Al-Khalaifa, S. Behbehani, A. Al-Haddad, and F. Al-Matrouq, Aridland Agriculture Department, Kuwait Institute for Scientific Research, P.O.Box 24885, Safat 13109, Kuwait.

Monday, 1:45 PM IMMUNOLOGY

Room E

Chair: Robert Porter, *Purdue University*

- 1:45 146 Flow Cytometric Analysis of Bursal Lymphocyte Apoptosis. M. M. Compton* and J. K. Wickliffe, Department of Poultry Science, University of Georgia, Athens, GA 30602-2772.
- 2:00 147 T Cell Mitogen Response in Arkansas Rous Sarcoma Regressor and Progressor Chickens. G. F. Erf*, N. B. Anthony, T. K. Bersi, and X. Wang, Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 2:15 148 Embryonic Exposure to Lead Causes Modulations in Cell-mediated Immune Function in the Chicken. S. Chen^{1*}, K. A. Golemboski¹, and R. R. Dietert², ¹Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853, ²Institute of Comparative and Environmental Toxicology, Cornell University, Ithaca, NY 14853.
- 2:30 149 Comparison of the activity of cellular protective systems in cells from immune organs of chicken embryos from different strains. R. A. Hemendinger* and S. E. Bloom, Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University, Ithaca, NY.
- 3:15 150 *Rfp-Y* Genotype Affects the Fate of Rous Sarcomas in *B² B⁵* Chickens. K. T. LePage*¹, M. M. Miller², W. E. Briles³, and R. L. Taylor, Jr.¹, ¹Genetics Program and Department of Animal and Nutritional Sciences, University of New Hampshire, Durham, ²Dept. of Molecular Biology, Beckman Research Institute, City of Hope National Medical Center, Duarte, CA, ³Dept. of Biological Sciences, Northern Illinois University, DeKalb.
- 3:30 151 Protection against *v-src* DNA tumor growth by a DNA construct containing *src*, *gag* and *env*. I. Karagiannides, M. S. Halpern, and R. L. Taylor, Jr., Department of Animal and Nutritional Sciences, University of New Hampshire, Durham, NH 03824.
- 3:45 152 Effect of Selection for Increased Body Weight in Turkeys on T Lymphocyte Subpopulations and Mitogenic Responses. Z. Li^{1*}, K. E. Nestor¹, and Y. M. Saif², ¹Department of Animal Sciences ²Food Animal Health Research Program, The Ohio State University, Wooster, OH 44691.
- 4:00 153 Response of Chicken Lymphocytes to Outer Membrane Proteins of *Campylobacter Jejuni*. J. Zhu^{1*}, R. Meinersmann¹, K. Hiatt¹, and D. Evans², ¹Poultry Microbiological Safety Research Unit, Russell Agricultural Research Center, USDA, ARS, Athens, GA, ²Dept. of Medical Microbiology, University of Georgia, Athens, GA.

- 4:15 154 Dose response and organ invasion of day-of-hatch Leghorn chicks by different isolates of *Campylobacter jejuni*. C. R. Young^{1*}, R. L. Ziprin¹, M. E. Hume¹, L. H. Stanker¹, and M. E. Konkel², ¹USDA-ARS, Food Animal Protection Research Laboratory, College Station, TX 77845 ²Department of Microbiology, Washington State University, Pullman, WA 99164-4233.
- 4:30 155 Gut Immunity in the Chicken: Responsiveness of the Mucosal Epithelium to Antigenic Stimulation. D. J. Caldwell^{1*}, A. P. McElroy¹, R. A. Reinap¹, and H. D. Danforth², ¹Departments of Poultry Science and Veterinary Pathobiology, Texas A&M University, College Station, TX 77843 ²USDA/ARS/Livestock and poultry Sciences Institute, Parasite Biology and Epidemiology Laboratory, Beltsville, MD 20705.

Monday, 1:00 PM
NUTRITION A
Ingredients/Additives

Room R

Chair: Austin Cantor, *University of Kentucky*

- 1:00 156 Effect of Different Fat Sources on the Age-related Changes of the Serum Fatty Acid Profile of Broiler Chickens. S. Salado¹, J. Piquer^{*2}, M. Gracia¹, J. Mendez³, and G. G. Mateos¹, ¹Animal Production Department, Universidad Politecnica de Madrid, Spain 28040. ²Pfizer Animal Health, Madrid, Spain. ³Coren, S. C. LTDA., Orense, Spain.
- 1:15 157 Dietary Fat and Heat Distressed Broilers. M. O. Smith^{1*} and K. Soisuvan², ¹Department of Animal Science, The University of Tennessee, Knoxville, TN 37901, ²Department of Animal Sciences, Kasetsart University, Bangkok, Thailand.
- 1:30 158 Dietary flaxseed and probiotic supplementation to produce high ω 3 fatty acid and low cholesterol eggs. G. L. Pheko, E. R. Chavez, and P. C. Lague, Department of Animal Science, McGill University Macdonald Campus, 21,111 Lakeshore road, Ste-Anne Debellevue, H9X 3V9.
- 1:45 159 Marine Microalgae is Safe in Laying Hen Rations up to Five Times the Recommended Inclusion Rate. M. E. Van Elswyk, A. L. Ashford^{*}, W. R. Barclay, and J. R. Abril, OmegaTech Inc., 5766 Central Ave., Boulder, CO 80301.
- 2:00 160 Performance is Enhanced in Broilers Fed Cottonseed with a High (+) to (-) Gossypol Isomer Ratio. C. A. Bailey¹, M. S. Ziehr^{1*}, A. Haq¹, J. J. Fazzino, Jr.¹, R. D. Stipanovic², L. F. Kubena³, and H. L. Kim⁴, ¹Department of Poultry Science, Texas A&M University, College Station, ²USDA-ARS Southern Crops Research Lab, College Station, TX, ³USDA-ARS Food Animal Protection Research Lab, College Station, TX, ⁴Department of Veterinary Physiology and Pharmacology, Texas A&M University, College Station.
- 2:15 161 Effect of a Novel Hatchling Supplement on Performance of Light Weight Chicks Held For 25 Hours Prior to Farm Placement. A. H. Nilipour¹, E. E. M. Pierson², C. D. Knight², and J. Dong², ¹Grupo Melo, S.A. P. O. Box 333, Panama 1, Rep. of Panama, ²Novus International Inc. # 20, Research Park Dr. MSt. Charles, MO.
- 2:30 162 Xanac[®] Testing in Broilers. D. R. Sloan^{*} and D. P. Eberst, Department of Dairy and Poultry Sciences University of Florida, Gainesville, FL 32611.
- 3:15 163 Effect of High Supplementary Propionate in the Starter on Early Performance, Residual Yolk Sac, and Carcass Composition of Broiler Chicks from Diverse Strains. S. L. Vieira^{*} and E.T. Moran, Jr., Department of Poultry Science, Auburn University, Auburn, AL 36849-5416.
- 3:30 164 The Influence of Eggshell-49[®] on Shell Quality of Hens Grouped by Their Shell Quality. R. D. Miles^{*}, Department of Dairy and Poultry Sciences, University of Florida, Gainesville, FL 32611.

- 3:45 165 Influence of Betaine on Broilers Challenged with Two Levels of *Eimeria acervulina*. J. B. Hess*, M. K. Eckman, and S. F. Bilgili, Department of Poultry Science and ACES, Auburn University, 36849-5416.
- 4:00 166 Influence of Charcoal on Toxic Effects of Aflatoxin B1 in Growing Broiler. T. S. Koh, S. Y. Kim, U. S. Koo, J. T. Im, B. R. Kim, and S. G. Hwang, Department of Nutrition Resources, AARC, College of Animal Husbandry, Kon-Kuk University, Kwanjin-gu, Seoul 143-701, Korea.
- 4:15 167 The effect of using different levels of palm kernel meal in broiler diets. C. A. Garcia and A. G. Gernat, Departamento de Zootecnia, Escuela Agricola Panamericana. Tegucigalpa, Honduras.
- 4:30 168 The Effects of a Yeast Culture Addition to a Low-protein Diet on the Performance and Carcass Characteristics of Broiler Chickens. A. A. Onifade*, G. M. Babatunde, S. A. Afonja, S. G. Ademola, and E. A. Adesina, Department of Animal Science, University of Ibadan, Ibadan, Nigeria.
- 4:45 169 Performance of Starting Pullets in Response to Supplementation of Bakers' Yeast or a Feed-Grade Yeast Culture in a High-Fiber Diet. A. A. Onifade*¹, Q. A. Adebisi, A. Abubakar, A. E. Enowebot, and A. A. Odunsi², ¹Department of Animal Science, University of Ibadan, Ibadan, and ²Department of Animal Production and Health, Ladoke Akintola University of Technology, Ogbomoso, Nigeria.

Monday, 1:15 PM
NUTRITION B
Feeding Regimens/Feed Form

Room S

Chair: Michael Orth, *Michigan State University*

- 1:15 170 Development of mucosal function in the broiler small intestine. Z. Uni and D. Sklan, Hebrew University of Jerusalem, Faculty of Agriculture, Department of Animal Science.
- 1:30 171 The Effect of Delayed Access to Feed and Water on the Physical and Functional Development of the Digestive System of Young Turkeys. A. B. Corless* and J. L. Sell, Department of Animal Science, 201 Kildee Hall, Iowa State University, Ames, IA 50011-3150.
- 1:45 172 Feed Restriction Causes Atrophy of Lymphoid Organs and Reduction of Lymphocytes in Turkey Poults. L. El Hadri*, J. D. Garlich, and M. A. Qureshi, Department of Poultry Science, North Carolina State University, Raleigh.
- 2:00 173 Effect of Physical Feed Restriction on Body Composition, Carcass Conformation, Plasma Prolactin and Aspartate Aminotransferase Activity of Large White Turkey Breeder Hens. A. N. Crouch*¹, J. L. Grimes¹, V. L. Christensen¹, and K. K. Krueger², ¹Department of Poultry Science, North Carolina State University, Raleigh ²Diamond K Research, Marshville, NC.
- 2:15 174 Reduced Daily Energy Allowance of Broiler Breeders After 36 Weeks of Age. R. H. Harms*, H. R. Wilson, and G. B. Russell, Department of Dairy and Poultry Sciences University of Florida, Gainesville, FL 32611.
- 2:30 175 Response of Different Broiler Strains to Diverse 42-Day Commercial Feeding Programs on Further Processing Yields and Characteristics of Breast Meat. W. A. Dozier, III and E. T. Moran, Jr., Department of Poultry Science, Auburn University, Auburn, AL 36849-5416.
- 3:15 176 Influence of Dietary Amino Acid Level and Time of Changing Starter Diet on Live Performance and Carcass Composition of Male and Female Broilers Processed at Different Ages. E. A. Saleh*, J. H. Kersey, A. L. Waldroup, and P. W. Waldroup, Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.

- 3:30 177 Performance and Carcass Yield of Standard, Intermediate, and Label Broilers under Two Different Feeding Programs. G. P. Audren* and M. R. Lefrançois, Département des sciences animales, Université Laval, Ste-Foy, QC, Canada.
- 3:45 178 Could the results of some nutrition feeding trials be confounded with feed form and bird behavior? K. J. Wilson¹, R. S. Beyer*¹, D. L. Hasemann¹, J. R. Froetschner², and K. C. Behnke², ¹Department of Animal Sciences and Industry, ²Department of Grain Sciences and Industry, Kansas State University, Manhattan.
- 4:00 179 Effects of Feed Form and Feed Quality on Performance of 21-day-old Broilers. K. J. Wilson*¹, R. S. Beyer¹, D. L. Hasemann¹, J. R. Froetschner², and K. C. Behnke², ¹Dept. of Animal Sciences and Industry, ²Dept. of Grain Sciences and Industry, Kansas State University, Manhattan.
- 4:15 180 Effects of Feed Conditioning and Fat Application Methods on 3 to 6 Week Old Broiler Performance. K. J. Wilson*¹, R. S. Beyer¹, D. L. Hasemann¹, J. R. Froetschner², and K. C. Behnke², ¹Dept. of Animal Sciences and Industry, ²Dept. of Grain Sciences and Industry, Kansas State University, Manhattan.
- 4:30 181 Effect of physical form and energy level of diets formulated on total or digestible amino acid basis on the performance and body composition of 21-42 days-old male broilers. A. Maiorka, A. M. Penz, Jr.*, and A. M. Kessler, Departamento de Zootecnia da Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brasil 91540-000.
- 4:45 182 Performance of Broilers and Layers Fed High Levels of Treated Vetch(*Vicia sativa*) Seeds. M. T. Farran, P. B. Dakessian, M. G. Uwayjan, F. T. Sleiman, and V. M. Ashkarian, Animal Science Department, Faculty of Agricultural and Food Sciences, American University of Beirut, P.O. Box: 11-0236, Beirut, Lebanon.

Monday 1:30 PM
PHYSIOLOGY
Endocrinology and Male Physiology

Room H

Chair: Patricia Hester, *Purdue University*

- 1:30 183 Molecular Cloning and Characterization of Truncated Testis-Specific Prolactin Receptor Transcripts in the Sexually-Mature Chicken. J.-S. Tang*, J.N.-C. Mao, J. Burnside, and L. A. Cogburn, Department of Animal and Food Sciences, University of Delaware, Newark.
- 1:45 184 The Expression of Follicle Stimulating Hormone Receptor (FSH-R) During Testis Development of the Domestic Fowl. C. Hsu and J. D. Kirby, Department of Poultry Science, University of Arkansas, Fayetteville.
- 2:00 185 Variable nuclear size and sperm function in the Houbara bustard, *Chlamydotis undulata undulata*. G. J. Wishart*¹, C. Lindsay², H. J. Staines¹, and P. McCormick², ¹Avian Reproduction Group, University of Abertay Dundee, Bell Street, Dundee DD1 1HG, Scotland, UK and ²International Foundation for Conservation and Development of Wildlife, P.O. Box 116, Inezgane, Morocco.
- 2:15 186 A high efficacy extender for long term liquid storage of poultry semen. D. K. Palmer*, S. Bahashwan, Y. Al-Shikeli, and A. Al-Dahab, Department of Animal and Veterinary Sciences, College of Agriculture, SQU Box 34, Sultan Qaboos University, Al-Khod, Sultanate of Oman, PC 123.

- 2:30 187 Production of an Antiserum to the Beta Subunit of Chicken Thyroid Stimulating Hormone (TSH β). T. E. Porter^{1*}, R. Ramesh¹, R. W. Moore², W. Kuenzel¹, B. M. Hargis², and D. Y. Caldwell², ¹Department of Animal and Avian Sciences, University of Maryland, College Park, MD 20742 and ²Department of Pathobiology, Texas A&M University, College Station, TX 77843.
- 3:15 188 Effects of Fasting and Refeeding on the Somatotropic and Thyroid Axes in Juvenile Chickens. M. C. McGuinness, D. W. Long, and W. L. Bacon, Department of Animal Sciences, The Ohio State University, OARDC, Wooster.
- 3:30 189 Ontogeny of Growth Hormone Receptor Gene Expression in Broiler Chickens Divergently Selected for Growth Rate or Body Composition. L. A. Cogburn^{*1}, L. Li¹, M. C. McGuinness², M. Duclos³, B. Leclercq³, and J. Simon³, ¹Department of Animal and Food Sciences, University of Delaware, Newark, ²Department of Animal Sciences, OARDC, Wooster, OH, ³Station de Recherches Avicoles, INRA, 37380 Nouzilly, France.
- 3:45 190 Growth and Muscle Characteristics of Japanese Quail from Lines Differing Greatly in Mature Body Weight and in Reciprocal Crosses Between Them. M. H. Henry* and W. H. Burke, Department of Poultry Science, University of Georgia, Athens, GA 30602.
- 4:00 191 Characterization of a Tibial Explant Culture to Study Cartilage Degradation. M.W. Orth* and K.A. Chlebek-Brown, Department of Animal Science Michigan State University, East Lansing, MI 48824.
- 4:15 192 Effects of Sex, Age and Added Lead on α -Aminoevulinic Acid Dehydratase (ALAD) Activity in Chicks. R. I. Bakalli, G. M. Pesti*, W. O. Zornig, M. G. Neto, and H. P. Ewing, Department of Poultry Science, University of Georgia, Athens, GA 30602-2772.
- 4:30 193 No Effect of Chronic Non-cycling Heat Stress on Plasma Corticosterone in Broilers. J. L. M. Morgan, G. F. Erf, T. K. Bersi, M. L. Rhoads, and J. D. Kirby, Department of Poultry Science, University of Arkansas, Fayetteville.

Monday, PM POSTERS

Deans Hall

Environment and Management

- 194 Influence of Hatching Egg Sanitization Treatments on Egg Weight Loss During Incubation and Eggshell Surface Appearance. R. J. Buhr^{*1}, K. A. Poole², and G. N. Rowland², ¹USDA, ARS, Russell Research Center, PPMQ RU, Athens, GA, and ²Department of Avian Medicine, University of Georgia, Athens.

Genetics

- 195 Transfection of Chicken Blastoderm and Expression of Reporter Constructs in Early Chicken Embryos. K. Maruyama^{1*}, Y. Matsubara², and M. Naito², ¹United States Department of Agriculture, Agricultural Research Service Beltsville, MD 20705 ²National Institute of Animal Industry, Tsukuba, Japan.
- 196 Identification of Differentially Expressed Sequences in Chicken Skeletal Muscle Development. Y. Uno* and F. A. Ponce de Leon, Department of Animal Science, University of Minnesota, St. Paul.
- 197 Isolation of Chicken Slow Type Myosin Binding Protein C (MyBP-C) Gene and Analysis of its Expression Pattern During Muscle Development. Y. Uno* and F. A. Ponce de Leon, Department of Animal Science, University of Minnesota, St. Paul.

Nutrition

- 198 The Effect of Grain Sorghum Processing Method and Enzyme Addition on Broiler Chick Performance. R. S. Beyer*, K. J. Wilson, and D. L. Hasemann, Department of Animal Sciences and Industry, Kansas State University, Manhattan.
- 199 Effect of Enzyme Supplementation in Broiler Starter Diets with Reduced Levels of Energy and Protein. M. F. F. Fuentes*, E. R. Freitas, and G. B. Espmndola, Departamento de Zootecnia, Universidade Federal do Ceara, Rua Carlos Vasconcelos 350/61, Fortaleza, CE, Brasil, 60115-170.
- 200 Evaluation of Several Varieties of Barley With and Without β -glucanase in Diets Formulated Using TME_n values. J. M. Harter-Dennis*, K. Sterling, and M. Fosnaught, Department of Agriculture, University of Maryland Eastern Shore, Princess Anne, MD.
- 201 Artificial Neural Network Prediction of Amino Acid Profiles in Feed Ingredients: Advanced Optimization. T. L. Cravener* and W. B. Roush, Poultry Science Dept., Penn State University, University Park, PA 16802.
- 202 Efficacy of Phytaseed[®], a Phytase Containing Transgenic Canola, to Improve Phytate Phosphorus Utilization From Corn-Soybean Meal Diets Fed to Turkey Poults From Day 1 to 35. D. R. Ledoux*¹, J. N. Broomhead¹, J. D. Firman¹, and A. J. Bermudez², ¹Department of Animal Science and ²Department of Veterinary Pathobiology, University of Missouri, Columbia.
- 203 Effect of Phytase on Total and Phytate Phosphorus Retention of Feed Ingredients as Determined with Broilers and Laying Hens. K. L. Leske* and C. N. Coon, Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 204 Effects of Whole Barley Feeding and Enzymes Addition on Broiler Performance and Carcass Traits. J. Nahas* and M. R. Lefrançois, Département des sciences animales, Université Laval, Ste-Foy, QC, G1K 7P4, Canada..
- 205 The Effect of Varying Calcium and Cholecalciferol Levels on Phytate Digestibility and Phosphorus Utilization in Broiler Chickens Fed Wheat/Canola Meal Diets Supplemented with Phytase Enzyme. L. Nernberg, B. A. Slominski, and W. Guenter*, Department of Animal Science, University of Manitoba, Winnipeg, MB.
- 206 Enzyme Supplementation of Corn-Soy Based Layer Diets. S. E. Scheideler, A. Abudabos, and C. Wyatt, University of Nebraska and FinnFeeds International.
- 207 Effect of Diet, Level, and Source of Xanthophyll on Hen Performance and Egg Yolk Pigmentation. M. Angeles and S. Scheideler, University of Nebraska.
- 208 Comparison of 5 commercial enzymes in corn-soybean meal diets on broiler chick performance. M. Jackson*, Continental Grain Company, Research and Development, 222 Riverside Plaza, Suite 900, Chicago, IL 60606.
- 209 Dietary Protein and the Modern Turkey Poul: An Update on Intermediary Metabolis. R. W. Rosebrough, USDA-ARS, Beltsville, MD.
- 210 Developing β -Carotene Producing *Lactobacillus* Species by Introducing a Biosynthetic Gene Cluster from *Erwinia uredovora*. M. Sattar* and C. A. Bailey, Department of Poultry Science, Texas A&M University, College Station.
- 211 Polyglutamic Acid Enhances Performance of Broiler Chickens. S. Srinongkote*¹, Y. Toride², J. H. Kersey³, and P. W. Waldroup³, ¹Ajinomoto Sales (Thailand) Co., Bangkok, Thailand ²Ajinomoto Co., Tokyo, Japan ³Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.
- 212 The Effect of Supplementing Laying Hen Diets with Chitin and Shark Cartilage on Layer Performance and Egg Yolk Composition. J. F. F. Zapata*, M. F. F. Fuentes, E. R. Freitas, C. M. Nogueira, and L. A. Gondim, Departamento de Tecnologia de Alimentos e Departamento de Zootecnia, Universidade Federal do Ceará, Rua Carlos Vasconcelos 350/61, Fortaleza, CE, Brasil, 60115-170.

- 213 Consumption of Raw Velvet Beans (*Mucuna pruriens*) Alters Organ Weights and Intestinal Lengths in Broilers. L. B. Carew^{1*}, F. A. Alster¹, and A. G. Gernat², ¹Department of Animal Sciences, University of Vermont, Burlington, VT 05405 ²Departamento de Zootecnia, Escuela Agrícola Panamericana, Tegucigalpa, Honduras.
- 214 Evaluation of Velvet Bean (*Mucuna pruriens*) as a Feed Ingredient for Broilers. J. del Carmen¹, A. G. Gernat¹, and L. B. Carew^{2*}, ¹Departamento de Zootecnia, Escuela Agrícola Panamericana, Tegucigalpa, Honduras ²Department of Animal Sciences, University of Vermont, Burlington, VT 05405.
- 215 Availability of Phosphorus for Broilers in Calcium and Sodium Phosphates. N. H. Anzai, F. R. Lima^{*}, I. Mabe, R. Albuquerque, and C. X. Mendonça, Jr., Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo, Pirassununga, SP, Brazil.
- 216 Evaluation of Rendered Spent Hen Meals on a Total Amino Acid Versus a Digestible Amino Acid Basis. M. W. Douglas^{*} and C. M. Parsons, Department of Animal Sciences, University of Illinois, Urbana.
- 217 Use of different levels of dietary protein with high energy in developing pullets reared in hot climates. A. S. Hussein, Department of Animal Production, United Arab Emirates University, Al-Ain, U.A.E.

Pathology

- 218 Sequence Analysis of The VP2 Hypervariable Region of Infectious Bursal Disease Virus Isolates From Mainland China. Q. Zhou¹, M. Zhang², and J. Giambrone¹, ¹Department of Poultry Science, Auburn University, AL ²Department of Biochemistry, China Agricultural University, Beijing.
- 219 The Synergistic Activity of Ionophorous Anticoccidials and LY85775 Against Ionophore Insensitive Strains of *Eimeria*. S. A. Wilson, K. L. Watkins, G. O. O'Doherty, and C. K. Smith, II, Elanco Animal Health, Greenfield, IN.
- 220 Use of Ultrasonography for Detection and Development of Enlarged Sternal Bursa in Turkeys. F. Jirjis¹, P. Walter², S. Noll³, D. Halvorson¹, and D. Shaw⁴, ¹Departments of Veterinary Pathobiology, ²Small Animal Clinical Science, ³Animal Science, ⁴Veterinary Diagnostic Medicine, University of Minnesota, St. Paul.
- 221 Efficacy Evaluation of Lasalocid and Roxarsone Combination Medication with Different Geographical Field Strain Isolates of *Eimeria acervulina*. K. Pecelunas¹, H. D. Danforth², Schildknecht¹, and S. Davis¹, ¹Roche Vitamins, Inc., 45 Waterview Blvd., Parsippany, NJ, ²United States Department of Agriculture, ARS, LPSI, PBEL, Building 1040, Room 103, BARC East, Beltsville, MD.
- 222 Effectiveness Of The Growth Promoter Virginiamycin Used In Combination With Semduramicin Or Semduramicin Plus Roxarsone. C. R. Pinedo^{*1}, N. R. Bayne¹, G. F. Mathis², D. R. McIntyre³, T. N. TerHune⁴, and H. R. Spires¹, ¹Pfizer Inc., Lee's Summit, MO, ²Southern Poultry Research, Athens, GA, ³Carolina Quality Research, Chester, SC, ⁴Health Management Services, Tulare, CA.
- 223 Anticoccidial Efficacy Of Semduramicin In Combination With Virginiamycin And Roxarsone. H. R. Spires¹, J. A. Kula¹, C. R. Pinedo^{*1}, B. A. George², and C. L. Quarles², ¹Pfizer Inc, Lee's Summit, MO 64081, ²Colorado Quality Research, Wellington, CO.
- 224 Examination of Growth Velocity and Acceleration as Predictors of Pulmonary Hypertension Syndrome in Broilers. W. B. Roush^{1*} and R. F. Wideman, Jr.², ¹Department of Poultry Science, Penn State University, University Park, PA 16802 ²Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, AR 72701.

Processing and Products

- 225 Treatments for Stainless Steel that Reduce Bacterial Attachment and Biofilm Formation. J. W. Arnold* and S. H. Silvers, USDA-ARS, Russell Research Center, P.O. Box 5677, Athens, GA 30604-5677.
- 226 Comparison of various egg sanitizers with a peroxidase-catalyzed compound on eggshell surface microbial populations in a commercial egg washer. K. D. Knape^{1*}, J. B. Carey¹, S. R. McKee², R. P. Burgess¹, Y. M. Kwon¹, and S. C. Ricke¹, ¹Department of Poultry Science, 101 Kleberg Center, Texas A&M University, College Station, TX 77843-2472 ²Department of Food Science & Technology, University of Nebraska-Lincoln, NE 68583-0919.
- 227 Microbiological Effects of Modifying Chill Water pH using Carbon Dioxide. Z. Yang*, M. Doyle, M. Scantling, and A. Waldroup, Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.
- 228 Various Factors Affecting Recovery of Microorganisms From Broilers. M. Doyle*, X. Dong, M. Scantling, D. Edmondson, and A. Waldroup, Poultry Science Department, University of Arkansas, Fayetteville, AR 72701.
- 229 Microbiological Studies of Turkeys Condemned for a Dark, Firm, Fry-Like Condition (Cyanosis) in Southern Ontario. J. G. Mallia¹, R. Irwin², J.-P. Vaillancourt³, S. W. Martin¹, and S. A. McEwen¹, ¹Department of Population Medicine, University of Guelph, Guelph, ON, ²Health of Animal Laboratory, 110 Stone Road west, Guelph, ON, ³Department of Food Animal and Equine Medicine, North Carolina State University, Raleigh.
- 230 A Dark, Firm, Dry-Like Condition in Breast Meat of Chickens Condemned for Ascites, Valgus-Varus Deformity, and Emaciation. J. G. Mallia¹, S. Barbut², J.-P. Vaillancourt³, S. W. Martin¹, and S. A. McEwen¹, ¹Department of Population Medicine, University of Guelph, Guelph, ON N1G 2W1. ²Department of animal and Poultry science, University of Guelph, ON N1G 2W1. ³Department of Food animal and equine Medicine, North Carolina State University, Raleigh.
- 231 The Relationship Between Raw and Cooked Broiler Breast Meat Color and pH. D. L. Fletcher, M. Qiao*, and D. P. Smith, Department of Poultry Science, University of Georgia, Athens.
- 232 The Effect of an Herbal Extract on a Salt Carrier during a Simulated Chill on the Microbiological Quality of Broiler Carcasses. J. A. Dickens*, M. E. Berrang, and N. A. Cox, USDA, ARS, SAA, Russell research Center, Athens, GA 30604-5677.
- 233 The Effects of the Age of a Bruise on Skin Surface Appearance and Histological Characteristics in Broilers. J. K. Northcutt*¹, R. J. Buhr², and G. N. Rowland³, ¹Departments of Poultry Science, and ³Avian Medicine, The University of Georgia, Athens and ²USDA-ARS, Richard B. Russell Research Center, Athens, GA.
- 234 The Development of Pale, Exudative Meat in Two Genetic Lines of Turkeys Subjected to Heat Stress and Its Prediction by Halothane Screening. C. M. Owens^{1*}, S. R. McKee¹, N. K. Matthews², and A. R. Sams¹, ¹Department of Poultry Science, 101 Kleberg Center, Texas A&M University, College Station, TX 77843-2472 ²Department of Small Animal Medicine and Surgery, Texas A&M University, College Station, TX 77843-2472.
- 235 The Incidence and Characterization of Pale, Soft and Exudative Chicken Meat in a Commercial Plant. R. L. Woelfel*, C. M. Owens, E. M. Hirschler, and A. R. Sams, Department of Poultry Science, Texas A&M University, College Station, TX 77843-2472.
- 236 Use of cold-set whey protein gelation to improve poultry meat batters. S. Barbut and P. Hong-sprabhas, Department of Animal and Poultry Sci., University of Guelph, Guelph, Ontario, Canada.
- 237 The Effects of Gender and Diet on the Allo-Kramer and Warner Bratzler Shear Values of Broiler Breast Meat. G. H. Poole^{1*}, C. E. Lyon¹, A. Alley², J. Hess², S. F. Bilgili², R. J. Buhr¹, L. L. Young¹, and J. K. Northcutt³, ¹USDA-ARS, PPMQ, ²Auburn University, ³University of Georgia.

- 238 Detection of Chicken Breast Meat Bacterial Spoilage Using Photoionization Detection, GC-MS Analysis and Concomitant Microbial Analysis. S. D. Senter* and J. W. Arnold, USDA-ARS, Russell Research Center, Athens, GA.
- 239 Headspace Volatile Compound of Chicken Skin Fat From Different Rendering Methods. K. S. Sheu¹, T. C. Chen¹, and H. C. Liu², ¹Poultry Science Department, Mississippi State University, Mississippi State, ² Pig Research Institute Taiwan, PO Box 23, Tsu Nan Town, Hsin Tsu County, Taiwan, R.O.C..
- 240 Effects of Cryogenic Cooling of Shell Eggs with Carbon Dioxide on Haugh Unit Values and Egg Grades. D. R. Jones^{1*}, P. A. Curtis¹, K. E. Anderson², and F. T. Jones³, Departments of ¹Food Science and ²Poultry Science, North Carolina State University, Raleigh, North Carolina, 27695 and ³Department of Poultry Science, University of Arkansas, Fayetteville, Arkansas.
- 241 Solubility and Microstructure of Egg White Solids as Affected by Preparation Method. W. C. Lee* and T. C. Chen, Poultry Science Department, Mississippi State University, Mississippi State.
- 242 Measurement of the Strength of the Vitelline Membrane of Cryogenically Cooled Processed Shell Eggs. J. B. Tharrington^{1*}, P. A. Curtis¹, K. E. Anderson², and F. T. Jones³, ¹Department of Food Science and ²Poultry Science, North Carolina State University, Raleigh, North Carolina, 27695 ³Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 243 Altering Effects of Early Polyphosphate Treatment by Electrical Stimulation. L. L. Young* and C. E. Lyon, USDA-ARS, Russell Research Center, Athens, GA.

Tuesday 8:00 AM
ENVIRONMENT AND MANAGEMENT
Breeder and Hatch Effects on Chick Performance

Room Q

Chair: Ron Kean, *University of Wisconsin*

- 8:00 244 Sexual Maturation in Broiler Breeder Pullets as Influenced by Strain, 20-Week Body Weight and Feed Allocation. F. E. Robinson^{1*}, R. A. Renema¹, J. J. R. Feddes¹, M. J. Zuidhof², and J. L. Wilson³, ¹Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5 ²Alberta Agriculture, Food and Rural Development, 7000 - 113 St., Edmonton, AB T6H 5T6 ³Dept. of Poultry Science, University of Georgia, Athens, GA 30602.
- 8:15 245 Comb Growth and Plasma Estradiol 17- β Concentration during Sexual Maturation in Female Broiler Breeders. N. S. Joseph, R. A. Renema, K. A. Thorsteinson, and F. E. Robinson*, Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5.
- 8:30 246 Effects of Varying Feed Intake to Broiler Breeder Pullets from 22 to 24 Weeks of Age on Carcass Characteristics. F. E. Robinson*, R. A. Renema, and J. B. Ferrier, Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5.
- 8:45 247 Effects of Breeder Hen Strain, Feeding Program and Photostimulation Program on Broiler Growth and Carcass Characteristics. K. A. Thorsteinson^{1*}, F. E. Robinson¹, L. D. Muller¹, R. T. Hardin¹, M. J. Zuidhof², M. Newcombe³, and R. I. McKay³, ¹Dept. of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5, ²Alberta Agriculture, Food, and Rural Development, Edmonton, AB T6H 5T6, ³Shaver Poultry Breeding Farms Ltd., Cambridge, ON N1R 5V9.
- 9:00 248 Impact of Mixing Broiler Breeder Males with Females at Various Ages on Flock Performance. S. D. Peak*, J. J. Bruzual, J. Brake, and T. Johnson, Department of Poultry Science and Biomathematics Program, North Carolina State University, Raleigh, NC 27695-7608.

- 9:15 249 The Relationship between Male:Female Ratio and Fertility in Broiler Breeders. J. Brake*, S. D. Peak, and J. J. Bruzual, Department of Poultry Science, North Carolina State University, Raleigh, NC 27695-7608.
- 9:30 250 Body Weight and Semen Production of Broiler Breeder Males As Controlled by Crude Protein Levels and Feeding Regimes during Rearing. X. Zhang*, W. D. Berry, G. R. McDaniel, D. A. Roland, and P. Liu, Departments of Poultry Science and Physiology and Pharmacology, Auburn University, Alabama 36849.
- 10:15 251 Sequence analysis as an indicator of reproductive performance. M. J. Zuidhof*, F. E. Robinson², R. A. Renema², J. J. R. Feddes², and L. A. Goonewardene¹, ¹Alberta Agriculture, Food and Rural Development, \#204 7000-113 St., Edmonton, AB T6H 5T6 ²Department of Agricultural, Food and Nutritional Science, Edmonton, AB T6G 5P6.
- 10:30 252 Evaluation of the Effect of Hatching Egg Weight on Weight Gain and Carcass Yield of Chicks. J. L. Emmert, F. T. Jones*, and C. N. Coon, Department of Poultry Science, University of Arkansas, Fayetteville.
- 1:45 253 Effect of Wet Bulb Temperature during Hatching on Broiler Chick Quality from Pre-Peak Breeder Hens. J. J. Bruzual^{1*}, J. Brake¹, and E. D. Peebles², ¹Department of Poultry Science, North Carolina State University, Raleigh, NC 27695-7608, ²Department of Poultry Science, Mississippi State University, Mississippi State, MS 39762.
- 11:00 254 Effects of incubator humidity and broiler breeder age on yolk fatty acid content during the latter stages of incubation. M. R. Burnham^{1*}, E. D. Peebles¹, J. J. Bruzual², J. Brake², and S. Whitmarsh¹, ¹Poultry Science Department, Mississippi State University, Mississippi State, MS 39762 ²Department of Poultry Science, North Carolina State University, Raleigh, NC 27695-7608.
- 11:15 255 A Quantification of Egg Oxygen Consumption, Carbon Dioxide Production and Carbon, Energy, Dry Matter and Moisture Loss During an Incubation Cycle. C. J. Wiernusz^{1*}, W. A. Killgore¹, S. A. Hannan¹, S. Vanhooser², and R. G. Teeter², ¹Cobb-Vantress, Inc., Siloam Springs, AR 72761 ²Department of Animal Science, Oklahoma State University, Stillwater, OK 74078.
- 11:30 256 Day 1 Atmospheric Oxygen Effects on Broiler Growth Rate and Ascites Incidence. C. J. Wiernusz^{1*}, T. Belay², S. Vanhooser², and R. G. Teeter², ¹Cobb-Vantress, Inc., Siloam Springs, AR 72761 ²Department of Animal Science, Oklahoma State University, Stillwater, OK 74078.
- 11:45 257 Effects of Conjugated Linoleic Acid on Chick Neonatal Growth and Serum Lipids. M. A. Latour^{1*}, R. A. Meunier¹, A. A. Devitt², and B. A. Watkins², ¹Animal Sciences Department ²Food Sciences Department, Purdue University, West Lafayette, IN 47907.

Tuesday 9:00 AM GENETICS

Room P

Chair: David Pollock, *Perdue Farms*

- 9:00 258 Identification of Rapid Markers Associated with Spontaneous Cardiomyopathy in a Commercial Flock of Turkeys. S. D. Hamblin^{1*}, D. E. Waite¹, D. D. Frame², M. E. Pierpont³, R. L. Park¹, and R. N. Thwait¹, ¹Animal Science Department, Brigham Young University, Provo, UT 84602, ²Veterinary Department, Moroni Feed Company, P.O. Box 368, Moroni, UT 84646, ³Department of Pediatrics, University of Minnesota, Minneapolis, MN 55455.
- 9:15 259 Association of a Genetic Marker in the IGF-I Gene with Economically Important Traits in Egg-Layers. S. Joseph*, S. E. Aggrey, J. Yao, D. Zadworny, and U. Kuhnlein, Department of Animal Science, McGill University, Ste. Anne de Bellevue, Quebec, Canada, H9X 3V9.

- 10:15 260 Effect of Selection for Shape of the Growth Curve and Reproduction in Japanese Quail. L. L. Kinder, V. L. Melnychuk, M. A. Cooper, L. K. Stamps, and N. B. Anthony, Department of Poultry Science, University of Arkansas, Fayetteville.
- 10:30 261 Effect of Selection Age on Growth and Reproduction in Japanese Quail. V. L. Melnychuk, M. A. Cooper, L. L. Kinder, L. K. Stamps, and N. B. Anthony, ¹Department of Poultry Science, University of Arkansas, Fayetteville.
- 10:45 262 Transient Congenital Tremors, a Neurologic Condition in Day-old Dwarf SCWL Chicks. T. F. Savage* and K. M. Clarke, Department of Animal Sciences, Withycombe Hall, Oregon State University, Corvallis, OR 97331-6702.
- 11:00 263 Studies Characterizing the Appearance of and Genetic Influences on Embryonic Chick Edema. T. F. Savage* and K. M. Clarke, Department of Animal Sciences, Oregon State University, Corvallis, OR 97331-6702.
- 11:15 264 Performance and Digestive Tract Development Comparison of Hybrid Large White and Unselected Bronze Turkeys. T. D. Knezacek and H. L. Classen*, Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK.
- 11:30 265 Fertility, embryonic mortality and hatchability in indirect response to selection for body weight and egg number in Dandarawi chickens. M. A. Abdellatif, Department of Animal and Poultry Production, Faculty of Agriculture, Assiut University, Assiut, Egypt.
- 11:45 266 Use of Supplementary Information of Residual Food Consumption in Selection Programs for Laying Hens. F. H. Abdou¹, A. A. Enab¹, and N. Kolstad², ¹ Department of poultry production, Faculty of Agriculture, Menofya University, Shebin El-Kom, Egypt. ² Department of Animal Science, Agricultural University of Norway.

Tuesday, 8:30 AM
NUTRITION A
Enzymes

Room R

Chair: Fraulene McKnight, *BASF Corporation*

- 8:30 267 Comparison of Genetically Engineered Microbial and Plant Phytase for Young Broilers. Z. B. Zhang*¹, E. T. Kornegay¹, D. M. Denbow¹, C. T. Larsen², and H. P. Veit², ¹Dept. of Animal and Poultry Sciences, ²Dept. of Biomedical Science and Pathobiology, Virginia-Maryland Regional Veterinary College.
- 8:45 268 Effects of Dietary Phosphorus Level, High Available Phosphorus Corn, and Microbial Phytase on Performance and Fecal Phosphorus Content. 1. Broilers Grown to 21 d in Battery Pens. J. H. Kersey^{1*}, E. A. Saleh², H. L. Stilborn², R. C. Crum, Jr.², V. Raboy³, and P. W. Waldroup¹, ¹Poultry Science Department, University of Arkansas, Fayetteville, AR 72701 ²Pioneer Hi-Bred Int., Johnson, IA 50131 ³USDA-ARS, Aberdeen, ID 83210.
- 9:00 269 Effects of Dietary Phosphorus Level, High Available Phosphorus Corn, and Microbial Phytase on Performance and Fecal Phosphorus Content. 2. Broilers Grown to Market Weights in Litter Floor Pens. F. Yan¹, J. H. Kersey¹, H. L. Stilborn², R. C. Crum, Jr.², D. W. Rice², V. Raboy³, and P. W. Waldroup^{1*}, ¹Poultry Science Department, University of Arkansas, Fayetteville, AR 72701 ²Pioneer Hi-Bred Int., Johnson, IA 50131 ³USDA-ARS, Aberdeen, ID 83210.
- 9:15 270 The Effect of Various Dietary Levels of Phytase and Available Phosphorus on Performance of Laying Hens. S. D. Boling*, M. W. Douglas, R. B. Shirley, C. M. Parsons, and K. W. Koelkebeck, Department of Animal Sciences, University of Illinois, Urbana.

- 9:30 271 Influence of Phosphorus and Phytase on Performance of Commercial Leghorns Through Cycle One. M. M. Bryant and D. A. Roland, Sr., Poultry Science Department and Al. Agric. Exp. Sta., Auburn University, AL 36849-5416.
- 10:15 272 Adaptability of the Broiler, as Judged by Performance and Gastrointestinal Tract Size, to Dietary NSP. E. N. Fischer* and H. L. Classen, Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK.
- 10:30 273 Effect of enzyme supplementation on nutrient digestibility and performance of wheat-fed broiler. M. Garcia¹, R. Lazaro¹, C. Centeno², P. Sorensen³, and G.G. Mateos¹, ¹Animal Production Department. Universidad Politecnica de Madrid, Spain, 28040 ²CSIC. Madrid, Spain, 28040 ³Danisco Ingredients. Braband, Denmark, DK-8220.
- 10:45 274 Influence of Heat Processing of Barley and Enzyme Supplementation on Nutrient Digestibility and Performance of Broiler Chicks. M. Garcia*, R. Lazaro, M. Gracia, R. Revuelta, and G. G. Mateos, Animal Production Department. Universidad Politecnica de Madrid, Spain, 28040.
- 11:00 275 Effect of Enzyme Supplementation on Digestive Transit Time and Volatile Fatty Acid Production in Cecum of Broiler Chicks Fed on Rye-Based Diets. R. Lazaro^{1*}, M. Garcia¹, M. Gracia¹, L. Campbell², and G. G. Mateos¹, ¹Universidad Politecnica de Madrid. Spain. ²University of Saskatchewan. Saskatoon. Canada.
- 11:15 276 Effect of Rye Variety and Enzyme Supplementation to Diets on Performance, Intestinal Viscosity and Digestive Organ Size of Broiler Chicks. R. Lazaro*, M. Garcia, I. Castellanos, S. Salado, and G. G. Mateos, Universidad Politecnica de Madrid, Spain.

Tuesday, 8:45 AM PATHOLOGY

Room E

Chair: Joseph Giambrone, *Auburn University*

- 8:45 277 The Effect of Vitamin D₃ on the incidence of turkey osteomyelitis complex in an experimental *Escherichia coli* respiratory infection. G. R. Huff*, W. E. Huff, J. M. Balog, and N. C. Rath, USDA/ARS/PPPSRU, Fayetteville, AR 72701.
- 9:00 278 Normal Avian Gut Flora in Turkey Poults for the Reduction of *Salmonella* Colonization. R. P. Burgess^{1*}, J. B. Carey¹, K. D. Knape¹, and B. J. Kelly², ¹Department of Poultry Science, Texas A&M University, College Station, Texas 77843 ²Bayer Corporation, Poultry Business Unit, Watkinsville, Georgia.
- 9:15 279 Development of a Rapid, Sensitive, and Inexpensive Bioassay for Detection of Antibiotic Residues in Chicks. D. Y. Caldwell^{1*}, S. D. Young¹, D. J. Caldwell¹, J. R. DeLoach², and B. M. Hargis¹, ¹Department of Veterinary Pathobiology ²Department of Poultry Science, Texas A&M University, College Station, Texas 77843 ³M.S. BioScience, Dundee, IL 60118.
- 9:30 280 Studies on the Resistance of *Eimeria Tenella* to Polyether Ionophorous Drugs in Chickens. J. Hu*, L. Yu, R. Zou, and M. Wang, College of Veterinary Medicine, China Agricultural University, Beijing 100094, China.
- 10:15 281 Effects of Diclazuril on Turkey Performance, in Simulated Use Floor Pen Studies, When Challenged With Recent Field Isolates of *Eimeria gallopavonis*, *E. meleagrimitis*, and *E. adenoeides*. C. L. Quarles¹, B. A. George¹, G. F. Mathis², and C. D. Baldwin^{*3}, ¹Colorado Quality Research, Wellington, CO, ²Southern Poultry Research, Athens, GA, ³Schering-Plough Animal Health, Union, NJ.
- 10:30 282 Data needed by FDA's Center for Veterinary Medicine for evaluating the utility of substances proposed for use in binding aflatoxins in feeds. H. E. Ekperigin*, United States Food and Drug Administration (FDA), Center for Veterinary Medicine, Rockville, MD.

- 10:45 283 Ascites in Broiler Chickens: Electrophysiological, Pathological, Ultrastructural, and Hemodynamic Consideration. A. A. Olkowski^{1*}, J. A. Abbott², D. Korver³, H. L. Classen¹, and L. Kumor⁴, ¹Department of Animal and Poultry Science, ²Department of Veterinary Internal Medicine, University of Saskatchewan, Saskatoon, SK, Canada S7N 5B5, ³Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, Canada T6G 2P5 ⁴Canadian Food Inspection Agency, 2162 Airport Drive, Saskatoon, SK, Canada, S7L 6M6.
- 11:00 284 Gross and Microscopic Changes in Enlarged Sternal Bursa of Market Male Turkeys. F. Jirjis¹, S. Noll², D. Shaw³, and D. Halvorson¹, ¹Departments of Veterinary PathoBiology, ²Animal Science, ³Veterinary Diagnostic Medicine, University of Minnesota, St. Paul.
- 11:15 285 Breast Muscle Growth and Fibre Damage in Selected and Unselected Strains of Turkey. L. J. Mills^{1,2*}, M. A. Mitchell², and M. Mahon¹, ¹Biological Sciences, University of Manchester, Oxford Road, Manchester, M13 9PT, UK, ²Roslin Institute (Edinburgh), Roslin, Midlothian, EH25 9PS, UK.
- 11:30 286 Metabolic and Hormonal Profiles in Hypoglycaemic Spiking Mortality Syndrome in Broilers. M. A. Mitchell*, A. J. Carlisle, and R. R. Hunter, Roslin Institute (Edinburgh), Roslin, Midlothian, EH25 9PS, UK.
- 11:45 287 Encephalomalacia in Commercially-raised Emus. P. Aye^{1*}, T. Morishita¹, S. Grimes², A. Skowronek², and R. Mohan², ¹Department of Veterinary Preventive Medicine, The Ohio State University, 1900 Coffey Rd, Columbus, OH 43210 ²Ohio Department of Agriculture, Animal Diagnostic Laboratory, Reynoldsburg, OH 43068.

Tuesday, 8:30 AM
PHYSIOLOGY
Embryology

Room H

Chair: Nickolas Zimmermann, *University of Maryland*

- 8:30 288 Expression of Cell Death Regulatory Genes in Chicken Blastodermal Cells. D. E. Muscarella* and S. E. Bloom, Department of Microbiology and Immunology, Cornell Universtiy, Ithaca, NY.
- 8:45 289 Sensitivity of Chicken Blastodermal Cells to the Induction of Apoptotic Cell Death. S.E. Bloom* and D. E. Muscarella, Department of Microbiology and Immunology, Cornell University, Ithaca, NY.
- 9:00 290 Expression of c-kit and SCF During the Active Migratory Period of Primordial Germ Cell Development in the Chicken. C. D. Hunter*, L. Karagenc, and J. N. Petite, Department of Poultry Science, North Carolina State University, Raleigh.
- 9:15 291 Characterization of Stage Specific Embryonic Antigen-1 (SSEA-1) as a Marker for Turkey Primordial Germ Cells. S. D'Costa* and J. N. Petite, Department of Poultry Science, North Carolina State University, Raleigh.
- 9:30 292 Identification of the Incubation Period When Broiler Breeder Embryonic Development is Delayed Due to Egg Storage for 14 Versus 4 Days. G. M. Fasenko* and F. E. Robinson, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton.
- 10:15 293 Enrichment for Blastodermal Cells Expressing Germline Specific Epitopes Using Magnetic Activated Cell Sorting. C. E. Stunden*, K. Brand, and R. J. Etches, Department of Animal and Poultry Science, University of Guelph, Guelph, Ontario, Canada N1G 2W1.
- 10:30 294 Immunogenecity of turkey and quail perivitelline layer proteins in chickens and its effect of fertility. P. Kapoor* and B. Howarth, Department of Poultry Science, University of Georgia, Athens, GA 30602-2772.

- 10:45 295 Relation of Eggshell Conductance Constants and Genetics to Survival of Turkey Embryos. V. L. Christensen*¹, W. E. Donaldson¹, and K. E. Nestor², ¹Department of Poultry Science, North Carolina State University, Raleigh, ²OARDC, Ohio State University, Wooster.
- 11:00 296 Effect of Breeder Hen Age and Egg Size on Poult Development. T. J. Applegate* and M. S. Lilburn, Dept. of Animal Sciences, The Ohio State University, OARDC, Wooster, OH 44691.
- 11:15 297 Ontogeny of Prolactin-Secreting Cells during Chick Embryonic Development: Effect of Vasoactive Intestinal Peptide. K. L. Woods¹ and T. E. Porter², ¹Department of Poultry Science, Texas A&M University, College Station, and ²Department of Animal and Avian Sciences, University of Maryland, College Park.
- 11:30 298 Growth and Gonadal Development of Turkeys Hatched from eggs Injected with an Aromatase Inhibitor. W. H. Burke, Department of Poultry Science, University of Georgia, Athens, GA 30602.
- 11:45 299 Comparative Development of Poult and Pekin Duckling Small Intestine. T. J. Applegate* and M. S. Lilburn, Dept. of Animal Sciences, The Ohio State University, OARDC, Wooster, OH 44691.

Tuesday, 8:30 AM

PROCESSING AND PRODUCTS

Room F

Chair: Doug Smith, *University of Georgia*

- 8:30 300 Influence of Electrical Stunning, Electrocution, and Electrical Stimulation on Post-mortem Feather Retention Force in Broilers. R. J. Buhr^{1*}, J. A. Dickens¹, and G. N. Rowland², ¹USDA, ARS, RRC, PPMQ RU, Athens GA 30604-5677, and ²Department of Avian Medicine, University of Georgia, Athens, GA.
- 8:45 301 Quality and Yields of Broiler Feet as Influenced by Strain-Cross, Sex and Feeding Programs. M. A. Alley, S. F. Bilgili*, E. T. Moran, and J. B. Hess, Department of Poultry Science, Auburn University, Auburn, AL 36849-5416.
- 9:00 302 The Effects of Age and Strain on the Allo-Kramer and Warner Bratzler Shear Values of Broiler Breast Meat. G. H. Poole^{1*}, C. E. Lyon¹, A. Alley², J. Hess², S. F. Bilgili², R. J. Buhr¹, L. L. Young¹, and J. K. Northcutt³, ¹USDA-ARS, PPMQ, ²Auburn University, ³University of Georgia.
- 9:15 303 Effects of ethanol rinse, *Lactobacillus fermentum* inoculation, and modified atmosphere packaging on the quality of ground chicken meat. T. Keokammerd* and P. L. Dawson, Clemson University.
- 9:30 304 Comparison on the Effect of Enzyme Hydrolysis and Heat Extraction on the Quality of Spent Hen Meat Extracts. S. N. Lin and S. C. Tang, Department of Food and Nutrition, Providence University, Shalu, Taiwan, R.O.C..
- 10:15 305 The Use of Poultry Mortality Silage as a Bait for the Harvesting of Red Swamp Crawfish (*Procambarus clarkii*) and Blue Crabs (*Callinectes sapidus*). T. F. Middleton*¹, P. R. Ferret¹, R. J. Hines², H. V. Daniels³, and L. C. Boyd⁴, ¹Dept. of Poultry Science, NC State University, Raleigh, ²NC Sea Grant, Morehead City, NC 28557 ³Dept. of Zoology, NC State University, Raleigh, ⁴Dept. of Food Science, NC State University, Raleigh.
- 10:30 306 Recovery and Utilization of Useful By-Products from Egg Processing Wastewater Using Electrocoagulation and Ultrafiltration. L. J. Xu¹, B. W. Sheldon*¹, D. K. Larick¹, and R. E. Carawan², ¹Department of Food Science, North Carolina State University, Raleigh, ²Infod Ltd., Raleigh, NC.

- 10:45 307 Analysis of Cholesterol Oxidation Products in Turkey Meat and Egg Yolk. D. U. Ahn, J. I. Lee, C. Jo*, S. K. Jin, and J. L. Sell, Department of Animal Science, Iowa State University, Ames, IA.
- 11:00 308 The Incidence and Characterization of Pale, Soft, Exudative Turkey Meat in a Commercial Plant. C. M. Owens, E. M. Hirschler, S. R. McKee, and A. R. Sams, Department of Poultry Science, 101 Kleberg Center, Texas A&M University College Station, TX 77843-2472.
- 11:15 309 Rapid Postmortem Glycolysis and Delayed Chilling Have Detrimental Effects on Turkey Muscle Proteins. B. M. Rathgeber*, J. A. Boles, and P. J. Shand, Department of Applied Microbiology and Food Science, University of Saskatchewan, Saskatoon, Sask, S7N 5A8.
- 11:30 310 Evaluation of color defects in fully-cooked chicken. D. P. Smith* and D. L. Fletcher, Department of Poultry Science, University of Georgia, Athens.

Tuesday, AM POSTERS

Deans Hall

Environment and Management

- 311 Effect of feed restriction in broilers raised at simulated high altitude 1. Ascites incidence and weight gain. M. A. Cooper¹, J. M. Balog², K. Halterman¹, B. Kidd¹, L. Mullikin¹, and N. B. Anthony¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville, ²USDA/ARS/PP&PSR, Fayetteville, AR.
- 312 Effect of feed restriction in broilers raised at simulated high altitude 2. Hematology and clinical chemistries. J. M. Balog¹, M. A. Cooper², K. Halterman², B. Kidd², L. Mullikin², and N. B. Anthony², ¹USDA/ARS/PP&PSR, Fayetteville, AR, ²Department of Poultry Science, University of Arkansas, Fayetteville.
- 313 Cage-type preference in laying hens. J. J. Elston*, M. M. Beck, and V. Vega, Department of Animal Science, University of Nebraska-Lincoln.
- 314 The Effect of Zinc Oxide on Litter Consumption by Free Roaming Brown Egg-type Nesting Hens During Forced Molt. D. L. Hasemann, R. S. Beyer*, and J. M. O'Brate, Department of Animal Sciences and Industry, Kansas State University, Manhattan.
- 315 Effect of Feed Form on the Performance of Late Beak Trimmed Egg-type Replacement Pullets. D. L. Hasemann¹, R. S. Beyer*¹, J. R. Froetschner², and K. C. Behnke², ¹Department of Animal Sciences and Industry, ²Department of Grain Science and Industry, Kansas State University, Manhattan.
- 316 Performance of Laying Hens Provided Well Drinking Water. K. W. Koelkebeck*¹, J. S. McKee¹, P. C. Harrison¹, C. M. Parsons¹, and R. A. Zimmerman², ¹Department of Animal Sciences, University of Illinois, Urbana, ²Purina Mills, Inc., St. Louis, MO.
- 317 Effects of Age at Photostimulation on the Egg Production and Morphological Characteristics of Laying Hens. A. A. B. Spies*¹, H. L. Classen¹, and F. E. Robinson², ¹Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK, Canada, ²ANFS, University of Alberta, Edmonton, AB.
- 318 Productive Performance and Fertility of Broiler Breeders Maintained in Colony Cages and on Conventional Flooring. K. J. Mwashighadi and R. A. Peterson, Department of Animal & Veterinary Sciences, West Virginia University, Morgantown.

Nutrition

- 319 Influence of Dietary Enzyme Supplementation on Young Turkeys Fed Different Grain Sources. S. Jin^{1*}, P. E. Palo¹, J. L. Sell¹, and M. F. Soto-Salanova², ¹Department of Animal Science, 201 Kildee Hall, Iowa State University, Ames, IA 50011-3150 ²FinnFeeds International, Ltd., Madrid, Spain.
- 320 Effects of Betaine and Methionine Levels in Broilers Chickens Fed Different Levels of Energy and Protein. M. G. Neto^{*}, G. M. Pesti, and R. I. Bakilli, Department of Poultry Science, University of Georgia, Athens, GA 30602-2772.
- 321 The Sparing Effect of Methyl Donors on the Methionine Requirement of Laying Hens. K.-N. Hsu and R. E. Austic, Department of Animal Science, Cornell University, Ithaca, NY.
- 322 The Effect of an Imbalancing Mixture of Amino Acids on Isoleucine Utilization and the Activity of Hepatic Branched-Chain Keto Acid Dehydrogenase in Chicks. B.-C. Park and R. E. Austic, Department of Animal Science, Cornell University, Ithaca, NY.
- 323 Effect of Betaine in *Eimeria acervulina*-Infected Chicks. J. O. Matthews^{*} and L. L. Southern, Department of Animal Science, Louisiana State University Agricultural Center, Baton Rouge.
- 324 The Effect of Feeding Excess Methionine on Live Performance and Carcass Characteristics of Broilers. N. Acar^{*} and P. H. Patterson, Department of Poultry Science, Pennsylvania State University, University Park.
- 325 Performance, Tissue Selenium Concentrations and Glutathione Peroxidase Activity of Turkeys Fed Graded Levels of Selenium. J. Ali^{*1}, D. R. Ledoux¹, A. J. Bermudez², and R. A. Sunde³, ¹Department of Animal Sciences, ²Department of Veterinary Pathobiology, ³Department of Biochemistry, University of Missouri, Columbia.
- 326 Effect of antioxidants and oxidized fat on the performance of broiler chicks. H. Namkung^{*} and S. Leeson, Department of Animal and Poultry Science University of Guelph, Guelph, ON N1G 2W1 Canada.
- 327 Effects of Strain, Dietary Vitamin E, and Interaction of Vitamin E and C on Hen Performance, Immune, and Antioxidant Status During Heat Stress. U. Puthongsiriporn^{*}, S. E. Scheideler, L. G. Robeson, and C. Novak, Department of Animal Science, University of Nebraska, Lincoln.
- 328 Effect of Vitamin and Trace Mineral Premixes when Substituted for Concentrates in Broiler and Layer Diets in Kuwait. A. Al-Nasser, K. Holleman, H. Al-Khailafa^{*}, A. Al-Saffar, S. Behbehani, A. Al-Haddad, and F. Al-Matrouq, Aridland Agriculture Department, Kuwait Institute for Scientific Research, P.O.Box 24885, Safat 13109, Kuwait.
- 329 Transfer of Dietary Conjugated Linoleic Acid to Egg Yolks of Chickens. M. Chamruspollert^{*} and J. Sell, Department of Animal Science, Iowa State University, 201 Kildee Hall, Ames, IA 50011-3150.
- 330 The Nutritional Value of a Highly Digestible Sorghum Cultivar for Broiler Chickens. R. G. Elkin^{1*}, E. Arthur¹, B. R. Hamaker², J. D. Axtell³, M. W. Douglas⁴, and C. M. Parsons⁴, Departments of ¹Animal Sciences, ²Food Science, and ³Agronomy, Purdue University, West Lafayette, IN 47907, and ⁴Department of Animal Sciences, University of Illinois, Urbana, IL 61801.
- 331 Degradation of Feed Proteins by Enzyme Treatment for *Escherichia coli* Auxotroph Lysine Assay. A. M. Erickson, C. L. Shermer, and S. C. Ricke, Department of Poultry Science, 101 Kleberg Center, Texas A&M University, College Station.
- 332 Digestible Threonine Requirement of Female Nicholas Poultts During the Starter Period. A. Kamyab^{*} and J. D. Firman, Department of Animal Sciences, University of Missouri, Columbia.
- 333 Effect of Dietary Fat Source in Laying Hen Diets on Egg Fatty Acid Profiles. N. D. Paton^{*1}, A. H. Cantor¹, M. J. Ford¹, B. T. Slaugh², A. F. Rizvi², and T. P. Karnezos³, ¹Department of Animal Sciences, University of Kentucky, Lexington, ²Eggland's Best, Inc., King of Prussia, PA, and ³Alltech, Inc., Nicholasville, KY.

- 334 Prediction Equation for Energy Requirements for Broiler Breeder Pullets. N. K. Sakomura*, R. Silva, A. Sanches, J. Ariki, and O. M. Junqueira, Faculdade de Ciências Agrárias e Veterinárias, Universidade Estadual Paulista, 14.870-000, Jaboticabal, SP., Brasil.
- 335 Influence of Antinutritional Factors on the Performance and Intestinal Epithelium Broiler Chickens. P. B. Oliveira^{2*}, A. E. Murakami^{1*}, E. O. Oviedo Rondon^{2*}, E. R. Garcia De Moraes^{2*}, and M. Macari^{3*}, ¹Departamento de Zootecnia Universidade Estadual de Maringa - Av. Colombo, 5790, Maringa, 87080-900 Parana - Brasil ²Graduate Students - MSc ³UNESP-Jaboticabal. SP. Brasil.
- 336 *v-src* Sodium Nutritional Requirement of Japanese Quail. E. O. Oviedo Rondon^{2*}, A. E. Murakami^{1*}, E. R. Garcia De Moraes^{2*}, P. B. De Oliveira^{2*}, and A. C. Furlan^{1*}, ¹Departamento de Zootecnia Universidade Estadual de Maringa - Av. Colombo, 5790, Maringa, 87080-900 Parana - Brasil ²Graduate Students - MSc.
- 337 Effect of Mannan Oligosacchride on Performance of Commercial Broiler Chickens. M. D. Sims¹, P. Spring^{2*}, and A. E. Sefton², ¹Virginia Scientific Research, Inc., Harrisonburg, VA, ²Alltech, Inc., Nicholasville, KY.

Physiology

- 338 Manipulation of Thyroid Status Alters Type-1 Deiodinase Gene Expression in the Broiler Chicken. C. P. Davolos*, J.-S. Tang, L. Li, and L. A. Cogburn, Department of Animal and Food Sciences, University of Delaware, Newark.
- 339 Cloning of a Partial cDNA for the Beta Subunit of Quail Thyroid-Stimulating Hormone. M. C. Catena*, T. E. Porter, and M. A. Ottinger, Department of Animal and Avian Sciences, University of Maryland, College Park, MD 20742.
- 340 Further Studies on Carry Over Effects of Dietary Crude Protein and Triiodothyronine (T3) in Broiler Chickens. R. W. Rosebrough* and J. P. McMurtry, USDA-ARS, Beltsville, MD.
- 341 Testicular Development, Semen Characteristics and Androgen Concentrations in Male Japanese Quail Raised under Subtropical Conditions. M. A. Abdelnabi*, H. Y. El-Hammady, and G. G. Raghib, Department of Animal and Poultry Production, University of Assiut, Assiut, 71111, Egypt.
- 342 Identification of Toms Whose Sperm Differ in Capability to Bind to an Egg-Membrane Substrate *in vitro*. S. P. Gill^{1*}, R. M. Hulet², and R. P. Amann¹, ¹BioPore Inc, PO Box 10074, State College, PA 16805, ²Department of Poultry Science, Pennsylvania State University, University Park, PA 16802.
- 343 *In vitro* Exposure of Cryopreserved Rooster Sperm to Synthetic Peptides of the Fertplus® Family Prior to AI Substantially Increases Fertility. S. P. Gill*, R. H. Hammerstedt, and R. P. Amann, BioPore Inc, PO Box 10074, State College, PA 16805.
- 344 Computer-aided (CASA) Measurement of Turkey Sperm Motility Parameters: Correlation With a Sire-selection Test. L. M. King* and A. M. Donoghue, Germplasm and Gamete Physiology Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, MD.
- 345 Use of Ultrasound to Assess Testis Development in Broiler Breeder Males. J. D. Kirby^{*1}, R. W. Rorie², J. Washington¹, M. L. Rhoads¹, V. L. Melynychuk², and N. B. Anthony¹, ¹Department of Poultry Science, ²Department of Animal Science, University of Arkansas, Fayetteville.
- 346 Impaired Testis Development and Spermatogenesis in Adult Male Fowl Following Unrestricted Prepubertal Growth and Subsequent Growth Restriction. J. D. Kirby¹, J. Washington^{*1}, M. L. Rhoads¹, and D. L. Kreider², ¹Department of Poultry Science, ²Department of Animal Science, University of Arkansas, Fayetteville.
- 347 Use of the Sperm Mobility Assay to Predict Sperm Fertilizing Ability in Broiler Breeder Males. M. L. Rhoads^{*1}, J. Washington¹, D. P. Froman², and J. D. Kirby¹, ¹Department of Poultry Science, University of Arkansas, Fayetteville; ²Department of Animal Science, Oregon State University, Corvallis.

- 348 Stage-Specific Gene Expression during Chicken Spermatogenesis. H. H. Tang, T. K. Bersi, G. F. Erf, and J. D. Kirby, Department of Poultry Science, University of Arkansas, Fayetteville.
- 349 Effect of Constant Light on Rhythms of Body Temperature and Activity in Laying Turkey Hens. J. L. M Morgan¹, J. Yang², W. L. Bacon², and J. D. Kirby¹, ¹Dept of Poultry Sci, Univ of Arkansas, Fayetteville; ²Dept of Animal Sci, Ohio St Univ, Wooster.
- 350 Effect of Feed Restriction and Levonorgestrel on Apoptosis in the Ovarian Germinal Epithelium of the Domestic Hen. K. E. Anderson^{1*}, J. N. Petitte¹, D. K. Carver¹, G. C. Rodriguez², and C. L. Hughes², ¹Department of Poultry Science, North Carolina State University, Raleigh, NC, 27695 and ²Department of Obstetrics and Gynecology, Duke University Medical Center, Durham, NC, 27710.
- 351 FSH Regulation of Follistatin and Inhibin α - and β_B -Subunit mRNA in Avian Granulosa Cells. A. J. Davis, C. F. Brooks, and P. A. Johnson, Department of Animal Science, Cornell University, Ithaca, NY 14853.
- 352 Migrating ability of the gonadal primordial germ (gPGCs) in domestic chicken. K. Yamanaka, A. Tajima, T. Kuwana¹, and Y. Kanai, Institute of Agriculture and Forestry, University of Tsukuba, Tsukuba, Ibaraki 305, Japan. ¹National Institute for Minamata Disease, Minamata, Kumamoto 867, Japan.

Wednesday, 8:15 AM
ENVIRONMENT AND MANAGEMENT
Production and Pathogens

Room Q

Chair: David Ledoux, *University of Missouri*

- 8:15 353 Influence of Biochrom® on the Response of Metabolic Hormones in PEMS-Infected Poults. R. E. Doerfler* and F. W. Edens, Department of Poultry Science, North Carolina State University, Raleigh.
- 8:30 354 Antimicrobial Resistance Patterns of *Salmonella* Isolates of Veterinary Origin. P. J. Fedorka-Cray^{1*}, M. A. Miller², D. A. Dargatz³, and L. Tollefson², ¹USDA-ARS-Richard Russell Research Center, Poultry Micro Research Unit, Athens, GA 30605 ²FDA-Center for Veterinary Medicine, 7500 Standish Place, Rockville, MD 20855 ³USDA-APHIS-CEAH-VS, Fort Collins, CO 80521.
- 8:45 355 Disk Diffusion Antimicrobial Susceptibility Tests Against Avian *Escherichia coli* Isolates. A. S. Fairchild*¹, J. L. Grimes¹, M. J. Wineland¹, and F. T. Jones², ¹Dept. of Poultry Science, N.C. State University, Raleigh, ²Dept. of Poultry Science, University of Arkansas, Fayetteville.
- 9:00 356 Effects of Photointensity and Color on Preening-Associated Ingestion of Spray-Applied Biologics in Neonatal Chicks. S. D. Young^{1*}, D. Y. Caldwell¹, E. T. Barnhart², J. R. DeLoach², and B. M. Hargis¹, ¹Texas A&M University, Texas Agriculture Experiment Station, College Station, TX 77843 ²MS BioScience, Dundee, IL 60118.
- 9:15 357 Comparison of the Colonization of *Salmonella typhimurium* in the Crops and Jejunums of Broilers Treated with or without Avian Pac Plus®. B. Promsopone¹, T. Y. Morishita¹, P. P. Aye¹, C. W. Cobb², and J. R. Clifford³, ¹Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, ²Loveland Industries, Inc., Greeley, Colorado ³United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, 12927 Stonecreek Drive Pickerington, Ohio.
- 9:30 358 Effect of a defined competitive exclusion culture (PREEMPT™) on cecal colonization and organ invasion by *Salmonella typhimurium* DT104 in broiler chickens. J. A. Byrd*, D. E. Corrier, R. H. Bailey, and L. H. Stanker, USDA-ARS, Food & Feed Safety Research Unit, College Station, TX 77845.

- 10:15 359 Influence Of T-2 Toxin and Tannic Acid on Cecal Volatile Fatty Acids and Susceptibility to *Salmonella typhimurium* Colonization in Broiler Chicks. L. F. Kubena*, R. H. Bailey, J. A. Byrd, C. R. Young, D. E. Corrier, and L. H. Stanker, USDA-ARS, Food Animal Research Laboratory, Food and Feed Safety Research Unit, College Station, TX.
- 10:30 360 Effect of Sub-Therapeutic Levels of Antibiotics in Feed on Intestinal Carriage of *Campylobacter* and *Salmonella* in Turkeys. M. E. Berrang, N. A. Cox, S. E. Craven, and N. J. Stern, USDA-ARS russell Research Center, Athens GA.
- 10:45 361 Changes in the Normal Bacterial Flora, pH, and Weights of the Crops of Chickens Subjected to Feed Withdrawal. A. Hinton, Jr.*, R. J. Buhr, and K. D. Ingram, PPMQ-ARS-USDA, Russell Research Center, Athens, GA 30604.
- 11:00 362 Survival of *Salmonella* in the Crop Contents of Market-Age Broilers During Feed Withdrawal. D. E. Corrier*¹, J. A. Byrd¹, B. M. Hargis², M. E. Hume¹, R. H. Bailey¹, and L. H. Stanker¹, ¹Food and Feed Safety Research Unit, USDA-ARS, College Station, TX, and ²TX Agricultural Experiment Station, College Station, TX.
- 11:15 363 The Use of Avian Specific Probiotics to Reduce *E. coli* in Broilers. T. Y. Morishita*¹, P. P. Aye¹, B. S. Harr¹, C. W. Cobb², and R. Stonerock³, ¹Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, ²Loveland Industries, Inc., Greeley, CO ³Carl S. Akey, Inc., Lewisburg, OH.
- 11:30 364 Aluminum Sulfate Treatment of Poultry Litter to Reduce Salmonella and Campylobacter Populations. J. E. Line, USDA, ARS, Poultry Microbiological Safety Research Unit, Russell Research Center, Athens, GA.
- 11:45 365 Recovery of *Campylobacter* From Dry Poultry Associated Samples. M. E. Berrang¹, N. A. Cox¹, M. T. Musgrove¹, and N. J. Stern¹, USDA-ARS Russell Research Center, Athens GA.

Wednesday, 8:30 AM EXTENSION-INSTRUCTION

Room F

Chair: Julie Northcutt, *University of Georgia*

- 8:30 366 Design of Environmental Control Systems for Poultry Research Facilities. M. P. Lacy*¹ and M. Czarick², ¹Department of Poultry Science, and ²Biological and Agricultural Engineering, University of Georgia, Athens, GA 30602-4356.
- 8:45 367 Operating Costs Associated with On-farm Refrigeration of Poultry Carcasses. J. P. Blake¹*, J. K. Tucker², and J. O. Donald³, ¹Department of Poultry Science, Auburn University, AL 36849 ²Alabama Cooperative Extension System, Linden, AL 36748 ³Department of Agricultural Engineering, Auburn University, AL 36849.
- 9:00 368 Feasibility and Economics of On-farm Poultry Carcass Fermentation. J. P. Blake¹*, R. M. Roden², and J. T. Scott², ¹Department of Poultry Science, Auburn University, AL 36849 ²Tennessee Valley Resource Conservation and Development Council, Decatur, AL 35603.
- 9:15 369 Further Studies on Paper Mill Waste Short Fiber as an Alternative Bedding for Broilers. J. C. Hermes¹*, H. S. Nakaue¹, and C. von Bargen Gould², ¹Department of Animal Sciences, Oregon State University, Corvallis, OR 97331-6702, and ²Absorption Corp., 1051 Hilton Ave., Bellingham, WA 98225.

- 9:30 370 Evaluation of a Recycled Paper Product as an Alternative Bedding Material for Broilers. J. P. Blake* and G. R. McDaniel, Department of Poultry Science, Auburn University, AL 36849.
- 10:15 371 The Effect of Endophyte Infected Grass Straw and Seed on Broilers. J. C. Hermes^{1*}, H. S. Nakaue¹, and M. A. Craig², ¹Department of Animal Sciences, Oregon State University, Corvallis, OR 97331-6702, and ²College of Veterinary Medicine, Oregon State University, Corvallis, OR 97331.
- 10:30 372 Nutrient Management Educational Material and Workshops for Poultry Producers. T. A. Carter^{*1}, G. H. Carpenter², J. L. Grimes¹, J. T. Parsons³, and M. J. Wineland¹, ¹Poultry Science Department, North Carolina State University, Raleigh, ²Chatham County Extension Center, Pittsboro, NC, ³Duplin County Extension Center, Kenansville, NC.
- 10:45 373 College Seniors' Views on Use of Animals. J. F. Stephens* and F. V. Muir, Department of Animal Sciences, The Ohio State University, Columbus, OH 43210.

Wednesday, 8:45 AM IMMUNOLOGY

Room E

Chair: Mark Compton, *University of Georgia*

- 8:45 374 Molecular Cloning and Biological Functions of Turkey Interferon- γ . S. You^{*1}, I.-J. Kim², J. Ahn¹, J. M. Sharma², and M. E. El Halawani¹, ¹Department of Animal Science, ²Department of Veterinary Pathobiology, University of Minnesota, St. Paul.
- 9:00 375 Effect of Triiodothyronine and Interferon-gamma Treatments on Chicken NK Cell Activity. J. A. Marsh, Department of Microbiology and Immunology, C5-103 VMC, College of Veterinary Medicine, Cornell University, Ithaca, NY.
- 9:15 376 The Effect of Substance P on Avian Macrophages. F. M. McCorkle and A. B. Scott, Department of Biology, Central Michigan University, MT. Pleasant, Michigan 48859.
- 9:30 377 Genetic line and MHC effects on primary and secondary antibody responses to T-dependent and T-independent antigens. M. Karaca^{*1}, E. Johnson², and S. J. Lamont², ¹ Department of Animal and Food Sciences, University of Delaware, Newark, ² Department of Animal Science, Iowa State University, Ames.
- 10:15 378 Molecular Genotyping and Serological Analysis of Broiler Chicken Major Histocompatibility Complex Haplotypes. N. Lakshmanan¹, F. T. Kopti², W. E. Briles², and M. G. Emara^{*1}, ¹Department of Animal and Food Sciences, University of Delaware, Newark, and ²Department of Biological Sciences, Northern Illinois University, DeKalb.
- 10:30 379 Naturally Occurring Rabbit Erythrocyte Agglutinins in Fowl Sera. P. F. Cotter, Biology Department, Framingham State College.
- 10:45 380 Denaturation Kinetics of Chicken Hemagglutinins Using 2-Mercaptoethanol and Heat. P. F. Cotter, Framingham State College.

Wednesday, 8:30 AM
NUTRITION A
Proteins/Amino Acids

Room R

Chair: Park Waldroup, *University of Arkansas*

- 8:30 381 Efficacy of 2-Hydroxy-4-(Methylthio) Butanoic Acid (HMB) Is Modified by Dietary Arginine:Lysine Ratio. D. Balnave^{1*}, J. Hayat¹, and J. Brake², ¹Department of Animal Science, University of Sydney, Camden, N.S.W. 2570, Australia, ²Department of Poultry Science, N.C. State University, Raleigh, NC 27695-7608, USA.
- 8:45 382 Tryptophan Bioavailability and Retention in Soybean Meal for Four-Week-Old Ducks. O. Adeola, Department of Animal Sciences, Purdue University, West Lafayette, IN.
- 9:00 383 Development of a Luminescent *Escherichia coli* Lysine Auxotroph Mutant for Rapid Detection of Lysine Bioavailability. A. M. Erickson*, Y. M. Kwon, and S. C. Ricke, Department of Poultry Science, 101 Kleberg Center, Texas A&M University, College Station, TX 77843-2472.
- 9:15 384 Ideal digestible amino acid profile of broiler starter and grower diets. M. Hruby*, K. L. Leske, and C. N. Coon, Department of Animal Science, University of Minnesota, St. Paul.
- 9:30 385 Digestible amino acid requirements for growth and maintenance for 10-21 and 32-43 day-old broilers. M. Hruby*, K. L. Leske, and C. N. Coon, Department of Animal Science, University of Minnesota, St. Paul.
- 10:15 386 Digestible Arginine Requirement of Starting Turkeys. M. L. Friday*, J. D. Firman, J. A. Martucci, and D. T. Moore, Department of Animal Sciences, University of Missouri, Columbia.
- 10:30 387 Age and sex affect whole body amino acid composition of turkeys. J. Postma*, C. W. Parks, and P. R. Ferket, Department of Poultry Science, North Carolina State University, Raleigh, NC 27695-7608.
- 10:45 388 The Combined Effects of Lysine and TSAA in Two Strains of Laying Hens. C. L. Novak* and S. E. Scheideler, University of Nebraska.
- 11:00 389 Performance of Four Commercial Strain Crosses Fed Varying Levels of Amino Acids and Energy. C. J. Price*, B. D. Lott, and J. B. Yeatman, Mississippi State University.
- 11:15 390 Optimal Dietary Methionine Levels for Broiler Chickens Fed Semduramicin. G. M. Pesti¹, R. I. Bakalli¹, H. M. Cervantes^{2*}, and K. W. Bafundo², ¹Department of Poultry Science, University of Georgia, Athens, GA 30602-2772 ²Pfizer Animal Health.

Wednesday, 8:30 AM
PHYSIOLOGY
General Physiology

Room H

Chair: David Peebles, *Mississippi State University*

- 8:30 391 Expression of the Proteoglycan Decorin during the Development and Progression of Atherosclerosis in Japanese Quail. B. B. Jarrold*, S. G. Velleman, and W. Bacon, Department of Animal Sciences Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, Ohio 44691.

- 8:45 392 Effect of Age, Diet Restriction, and Aminoguanidine on Skin Pentosidine and Meat Tenderness in Broiler Breeder Hens. M. Iqbal*¹, L. L. Probert¹, P. B. Kenney¹, H. Klandorf¹, and N. H. Al-humadi², ¹Division of Animal and Veterinary Science, West Virginia University, Morgantown, ²NIOSH/HELD, Morgantown, WV.
- 9:00 393 Effects of Fasting and Refeeding on Changes in Muscle and Liver Glycogen in Broiler Chickens. M. R. Edwards¹, J. P. McMurtry², and R. Vasilatos-Younken¹, ¹Dept. of Poultry Science, Penn State Univ., Univ. Park, ²Growth Biology Lab, USDA-ARS, Beltsville, MD.
- 9:15 394 The Acute Phase Response of Chickens to Bacterial Lipopolysaccharide Administration. H. Xie*, N. C. Rath, G. R. Huff, W. E. Huff, and J. M. Balog, USDA-ARS-PPPSRU, Poultry Science Center, University of Arkansas, Fayetteville, AR 72701.
- 9:30 395 Renal Responses of Normal and Preascitic Broilers to Systemic Hypotension Induced by Unilateral Pulmonary Artery Occlusion. M. F. Forman* and R. F. Wideman, Jr., Department of Poultry Science, University of Arkansas, Fayetteville, AR 72701.
- 10:15 396 Pulmonary Artery Relaxation Responses and Nitric Oxide Synthesis are Reduced in Broiler Chickens Exposed to Hypobaric Conditions. L. A. Martinez-Lemus*¹, R. K. Hester², E. J. Becker², G. A. Ramirez¹, J. S. Jeffrey³, and T. W. Odom¹, Poultry Science Dept.¹, College of Medicine², Texas A&M University, College Station, and University of California-Davis³, Tulare.
- 10:30 397 Cardiac Index, Oxygen Delivery, and Tissue Oxygen Extraction in Slow Growing and Fast Growing Chickens, and in Chickens with Heart Failure and Ascites: A Comparative Study. A. A. Olkowski¹*, D. Korver², B. Rathgeber³, and H. L. Classen¹, ¹Department of Animal and Poultry Science, ²Department of Applied Microbiology and Food Science, University of Saskatchewan, Saskatoon, SK, Canada S7N 5B5, ³Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, Canada T6G 2P5.
- 10:45 398 The Myoprotective Action of Oestrogen in the Broiler Chicken: A Receptor Mediated Effect? M. A. Mitchell*, A. J. Carlisle, and D. A. Sandercock, Roslin Institute (Edinburgh), Roslin, Midlothian, EH25 9PS, UK.
- 11:00 399 Heat Stress-Induced Skeletal Muscle Damage in Broiler Chickens: The Effect of Dantrolene Sodium. D. A. Sandercock* and M. A. Mitchell, Roslin Institute (Edinburgh), Roslin, Midlothian, EH 25 9PS, UK.
- 11:15 400 New Monochromatic Light Source for Laying Hens. I. Rosenboim¹, E. Zilberman², and G. Gvaryahu², ¹Hebrew University of Jerusalem, Faculty of Agriculture, Department of Animal Science ²O.L.T. Ltd., Software Incubators Har Hotzvim Jerusalem, Israel.
- 11:30 401 Some Aspects of Clinical Biochemistry of Broiler Chickens Fed Low-Protein Diets Supplemented Without and With Growth Promoting Yeast or Antibiotics. A. A. Onifade*¹, A. O. Ogunsanmi², P. C. Ozegebe³, and G. M. Babatunde¹, ¹Department of Animal Science, ²Department of Veterinary Pathology, and ³Department of Veterinary Anatomy, University of Ibadan, Ibadn, Nigeria.

Wednesday, 1:00 PM
INVITED LECTURE

Sponsored by the U.S. and Canadian Branches of the World's Poultry Science Association

Deans Hall

Introduction

Leo S. Jensen, University of Georgia

The Incredible Functional Egg

William Stadelman, Purdue University

Wednesday, 2:15 PM
ANNUAL BUSINESS MEETING

Deans Hall

Chair: *Henry L. Classen*, University of Saskatchewan
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Industry Committee for Poultry Science: R. A. Costain (1998) (Chair), W. C. Schwartz (1998) M. Sifri (1999), B. I. Fancher (1999), H. M. Cervantes (2000), C. L. Wyatt (2000), R. E. Buresh (2000), L. Bagley (2001), L. E. Marrett (2001), A. F. Giesen (Liaison).

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PSA PROGRAM 1998

Session	Monday Morning	Monday Afternoon	Tuesday Morning	Tuesday Afternoon	Wednesday Morning
Environment/Management	Room Q	Room Q	Room Q	Symposia ¹	Room Q
Immunology		Room E			Room E
Nutrition A	Room R	Room R	Room R	Symposia ²	Room R
Nutrition B	Room S	Room S		Symposia ³	
Physiology	Room H	Room H	Room H		Room H
Processing/Products	Room F		Room F		
Genetics	Room P		Room P		
Pathology	Room E		Room E		
Extension/Instruction		Room F			Room F
Posters	Deans Hall	Deans Hall	Deans Hall		

¹Reducing the Environmental Impact of Poultry Production: Focus on Phosphorus
(1:00 PM to 3:30 PM; Room Q)

²Managing Poultry Reproduction to Satisfy Market Demands (1:00 PM to 5:30 PM; Room R)

³Effective Poultry Science Programs in the Next Century (3:30 PM to 6:00 PM; Room S)