



# Midwest Poultry Consortium

## Mission Statement

The Midwest Poultry Consortium is organized to provide leadership, support and resources for poultry education and research in member states.

**Strategies.** Strategies, established in 1995 by the initial MPC Board of Directors, are continuously improved to meet the needs of the poultry industry and provide the foundation on which decisions are made.

**Leadership.** Support, maintain and enhance poultry science education and research at member state universities.

**Education.** Provide students with an emphasis in poultry science and encourage them to enter the poultry field.

**Research.** Increase basic and applied research in poultry and food science at member state universities.

**Communication.** Facilitate communication, coordination and interaction between industry, universities, government and interested public.

Following a two-year pilot program with the University of Florida and the Florida Poultry Federation, the MPC Board of Directors accepted Florida as a full member state in July, 2006. This created cross-country collaboration providing additional resources for the Center of Excellence Scholarship Program.



Participating States

## Arrington Receives 2009 Outstanding Service Award

MPC board member Lou Arrington is the seventh recipient of MPC's Outstanding Service Award. From Lou's long tenured service on the MPC board of directors and the Wisconsin Poultry Federation to his outstanding commitment to the COE program, Lou has dedicated his life to poultry. Lou is constantly providing for the COE students during their time in Madison - much of this at his own expense. Therefore, in recognition of his unyielding support for and dedication to COE students and the poultry industry as a whole, it is with deep appreciation that MPC awarded Lou Arrington the 2009 Outstanding Service Award. Arrington joins past recipients, Senator Tom Harkin (IA), Dr. Wendy Wintersteen (Iowa State University), Dennis Casey (Hy-Line International), Sue Lamont (Iowa State University), Ron Kean (University of Wisconsin-Madison), Bob Sparboe (Sparboe Companies), and Congressman Tom Latham (IA). *Congratulations Lou!*



Lou Arrington  
2009 Recipient

## Midwest Poultry Website - Your Home for Poultry Information!



From current research reports to job openings, the MPC website is your home for important poultry information. The website has undergone major transformations in the past few years to improve its overall effectiveness and readability.

The MPRP page boasts a searchable research project & researcher database, as well as current MPRP project objectives and information regarding research priorities. Visit the MPRP page to find a researcher or results from MPRP-funded research reports.

The Center of Excellence (COE) page offers pertinent information regarding the scholarship/internship program: syllabi for the COE courses, a COE events calendar, MPC member company profiles, an online application page, and a list of all current internship and full-time job openings. Contact the MPC office if you have an internship or job to post.

Visit [www.mwpoultry.org](http://www.mwpoultry.org) today!

# MPC Board of Directors

## Chair

**David Hurd - Egg**  
Rose Acre Farms

## Vice Chair

**Steve Anders - Egg**  
Hy-Line North America

## Secretary

**Nita Nurmi - Egg**  
Sparboe Companies

## Treasurer

**Pat Solheid - Turkey**  
Jennie - O Turkey Store

**Steve Anders - Egg**  
Hy-Line North America

**Gary Cooper - Turkey**  
Cooper Farms

**John Fagan - Allied**  
Chore-Time, an EPS Division

**Bill Garr - Allied**  
Hy-Line North America

**Ed Garrett - Turkey**  
West Liberty Foods

**Steve George - Egg**  
Fremont Farms of Iowa

**Gordy Gingras - Allied**  
Evonik Degussa Corporation

**Jim Jarvis - Turkey**  
Land O'Lakes Purina Feed

**Tim Johnson - Turkey**  
Willmar Poultry Company

**Steve Jurek - Broiler**  
Gold'n Plump

**Alan Koch - Allied**  
Henning Construction

**Kevin Roberson - Egg**  
Michael Foods

**Phil Sonstegard - Egg**  
Sonstegard Foods

**Mike Turk - Other species**  
Maple Leaf Farms

**Lou Arrington - Ex Officio**

## Center of Excellence Student Tracking

The Midwest Poultry Consortium's (MPC) student tracking and database system tracks COE graduates not only through their graduation, but also through full-time employment. The goal of the implemented system is to help track former COE students in full-time positions within MPC member companies and to retain as many students in the poultry industry as possible. See the students who have been placed with MPC member companies (*Students in the News*, pg. 5).

## Consortium Holds Annual Meeting - March 17

MPC's Annual Meeting was held on Tuesday, March 17, in conjunction with the Midwest Poultry Federation Convention in St. Paul. Chairman David Hurd welcomed those in attendance and introduced MPC President Beth Nelson for a review of the past year's events, including MPC's budget status and the Midwest Poultry Research Program.

The Secretary's report was given by Nita Nurmi and the Treasurer's report by Chairman Hurd, standing in for MPC Treasurer Pat Solheid. The Nominating Committee report was given by Chairman Hurd and was subsequently agreed to and approved by the membership.

Jenna Knoblauch, COE Student Director, followed with a summary of the current status of the Center of Excellence Scholarship Program, while former COE student Nick Braun spoke about his experience at the COE and the benefits it provides to both students and industry. Braun briefed participants about the day-to-day activities of students in the program, the long-term friendships which are formed, and the career benefits the program and internships offer students. Braun graduated from the University of Minnesota and currently works as a broiler service representative for Gold'n Plump.

## MPRP Funding Now Totals Over \$4 Million

The Midwest Poultry Consortium (MPC) places a high priority on securing funds for the Midwest Poultry Research Program (MPRP). MPC representatives met with Congressional staff on both the House and Senate Agricultural Appropriations Committee to garner support for continued MPRP funding. Thanks to Senator Harkin, Senator Grassley, Senator Klobachar and Congressman Latham, MPRP received \$471,000 last year, bringing the total awards to over \$4 million for poultry research projects. This was great news given the tight budget situation in Congress and serves as evidence of the high regard in which this program is held in Washington.

Each year, the MPC issues a call for proposals which are reviewed by a screening committee representing industry sectors and researchers. MPRP funding is awarded competitively with 40% going to critical industry needs regardless of species, 20% going to broiler research, 20% going to turkey research, and 20% going to layer research.

MPC is grateful to Iowa State University for their dedication to MPRP!

## COE Receives CHS Foundation Grant

MPC was awarded a grant of \$3,000 from the CHS Foundation to support the activities of the MPC's Center of Excellence Scholarship Program (COE). This was the sixth year of involvement in the Center of Excellence Scholarship Program for the CHS Foundation and demonstrates their dedication and commitment to agriculture and poultry education in our member states. *Thanks CHS Foundation!*

## MPC Staff

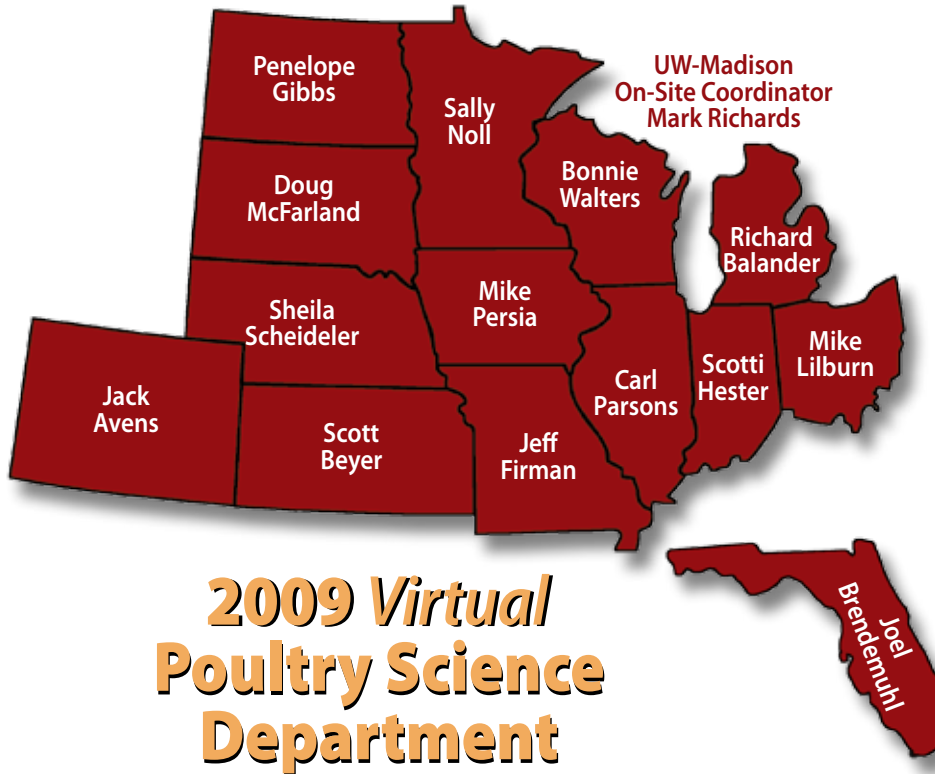
**Beth Nelson**, President  
**Jon Dockter**, Associate Director  
**Jenna Knoblauch**, Student Director  
**Chelsea Nelson**, Student Recruiter  
**Janet Osebold**, IT Director  
**Kelsey Campbell**, Intern

4630 Churchill Street, #1  
St. Paul, MN 55126  
651.766.8118  
mpc@mwpoultry.org  
www.mwpoultry.org

# COE Center of Excellence Scholarship/Internship Program

As the Midwest Poultry Consortium's Center of Excellence (COE) Scholarship Program completes its 14th year, the COE continues to educate students in poultry science and helps ensure the availability of qualified poultry graduates for employment within the industry.

The COE is unique in guiding students through recruitment, education, internship, employment, and networking opportunities in the poultry industry. The program brings together key faculty from participating universities and the foremost private industry experts, offering the strongest research-based poultry science education available in MPC member states. This program combines problem solving and state-of-the-art hands-on training in laboratory situations, interactive classroom lectures, and field trips for up to 32 scholarship recipients each year. Student scholarships include on-campus housing and up to 18 credits, which are earned in two six-week summer sessions. These courses complement a number of majors, and credits are transferable to the student's home university. Students are encouraged to participate in industry internships to further their poultry education. MPC strives to continuously improve this program to benefit students and the poultry industry for years to come.



## 2009 SESSION I

### Avian Physiology

Murray Bakst, USDA

Richard Balander, Michigan State University

**Mary Beck, University of Nebraska-Lincoln**

Mark Berres, University of Wisconsin-Madison

Patricia "Scotti" Hester, Purdue University

Alice Wentworth, University of Wisconsin-Madison

Bernie Wentworth, University of Wisconsin-Madison

### Breeder Flock & Hatchery Management

Darryl Barker, Hy-Line International

**Ron Kean, University of Wisconsin-Madison**

Sally Noll, University of Minnesota

Mike Wineland, North Carolina State University

### Poultry Products Technology

Dong Ahn, Iowa State University

Deana Jones, Russell Research Center

Michael Musgrove, Russell Research Center

**Mark Richards, University of Wisconsin-Madison**

## 2009 SESSION II

### Poultry Nutrition

**Mike Lilburn, The Ohio State University**

Carl Parsons, University of Illinois

### Avian Health

**Mark Cook, University of Wisconsin-Madison**

Rob Porter, University of Minnesota

### Poultry Enterprise Management

Allen Behl, Behl Turkey Farms

Chad Gregory, United Egg Producers

**Darrin Karcher, Michigan State University**

**Ken Koelkebeck, University of Illinois**

Keith Kulow, Daybreak Foods

Wendi Lallier, MacFarlane Pheasants

Jeremy Lies, Gold'n Plump

Brad Lillie, MacFarlane Pheasants

Tom Lohr, Henning Construction

Neil O'Sullivan, Hy-Line International

Chris Roedel, Daybreak Foods

**Course Coordinators indicated in bold type.**

## Wednesday Night Forums

On Wednesday evenings, students are able to interact with industry leaders in order to learn more about the poultry industry and future career opportunities. 2009 Forum participants:

**Craig Burda, Gold'n Plump**

**Michelle Early, Jennie-O Turkey Store**

**David Hurd, Rose Acre Farms**

**Jenna Knoblauch, Midwest Poultry Consortium**

**Rocky Lisowski, Gold'n Plump**

**Chris Theisen, MacFarlane Pheasants**

## COE Program Educates Over 400 Students!

The COE Program continues to be successful in educating students in poultry science. The Class of 2009 continued the record-breaking trend with 22 industry internships being provided by our MPC member companies. This is the highest number of internships provided in any year since the start of COE. To date, over 400 students have participated in the program, helping to lay a foundation for the next generation of leaders.

Breakdown of COE Students															
Year	CO	FL	IA	IL	IN	KS	MI	MN	MO	NE	ND	OH	SD	WI	Total Students:
2009	0	2	1	2	5	1	3	3	2	2	1	1	1	4	28
2008	0	2	3	1	4	1	3	3	3	1	1	0	1	6	29*
2007	0	1	3	1	8	2	3	2	1	0	1	1	2	5	30
2006	2	4	4	1	9	1	5	4	0	0	1	1	3	4	39
2005	3	3	4	1	2	0	2	2	0	3	1	1	2	6	30
2004	0	0	2	1	3	2	2	3	0	3	1	2	0	6	25
2003	0	0	2	0	4	2	2	1	0	2	1	4	0	5	23
2002	0	0	3	2	5	3	3	2	0	1	1	2	0	9	31
2001	0	0	1	2	6	4	4	0	0	2	0	1	2	10	32
2000	0	0	1	2	3	3	4	2	0	0	0	3	4	14	36
1999	0	0	1	0	2	0	6	3	0	1	0	2	1	10	26
1998	0	0	0	3	2	2	3	3	0	1	0	3	0	5	22
1997	0	0	1	2	1	2	0	2	0	2	0	5	1	13	29
1996	0	0	0	2	0	2	0	1	2	2	0	2	1	9	21
	5	12	26	20	54	25	40	31	8	20	8	28	18	106	401

\*29 Scholarships were awarded; however, one additional student paid their own way to attend COE classes.

<b>Total COE students completing one year:</b>	<b>264</b>
<b>Total COE students completing program:</b>	<b>137</b>

### Universities Represented in 2009

Iowa State University	1
Kansas State University	1
Michigan State University	3
North Dakota State University	1
Purdue University	5
South Dakota State University	1
The Ohio State University	1
University of Florida	2
University of Illinois	2
University of Minnesota – St. Paul	3
University of Missouri	2
University of Nebraska	2
University of Wisconsin – Madison	1
University of Wisconsin – River Falls	3

### 2009 Internships

Many of the MPC member companies provide internships and on-the-job opportunities for COE students. The internships fit the academic timetable for participating universities and complement COE courses.

**Zane Baker - Maple Leaf Farms**  
**Lauren Bencaz - Rose Acre Farms**  
**Manny Benitez - Rose Acre Farms; Gold'n Plump**  
**Bobbi Christenson - Gold'n Plump**  
**Jasma Collins - Rose Acre Farms**  
**Amy Davis - Center Fresh Egg**  
**Caleb Englin - Sonstegard Foods**  
**Melissa Evans - Hy-Line North America**  
**Jesse Holmgren - Cooper Farms**  
**Rheannon Jordan - Rose Acre Farms**  
**Robert Krenz - Gold'n Plump**  
**David Larson - Daybreak Foods**  
**Shane Mart - Hy-Line North America; Cal-Maine Foods**  
**Lucas Mayfield - MacFarlane Pheasants**  
**Dale Perez - S & R Egg Farm**  
**Robert Pfund - Sparboe Companies**  
**Michelle Prothman - West Liberty Foods**  
**Jared Sugden - Sparboe Companies**  
**Myah Walker - Sparboe Companies**  
**Nancy Warfield - Jennie-O Turkey Store**

**Internship Host:** We are seeking companies willing to provide hands-on experience for our COE students. If your company is willing to host a COE student intern, please contact the MPC office.

## “Wild Game Night” Banquet - Record Crowd!

A record-setting crowd gathered to honor the efforts, contributions, and accomplishments of both students and faculty at the “Wild Game Night” Banquet & Awards Ceremony, held at the Concourse Hotel & Governor’s Club in Madison, WI. More than 80 students, family members, staff, board members, faculty, and industry representatives gathered to honor the participants of the Midwest Poultry Consortium’s 2009 Center of Excellence Scholarship/Internship Program (COE), marking the end of the COE’s 14th consecutive summer session.



Lucas Mayfield and Gordy Gingras 'rocking out.'

The COE gives students an emphasis in poultry science delivered by leading poultry faculty in the upper Midwest, internship opportunities which pave the way for future employment within the industry, and the opportunity to develop lifelong friendships with other students over the course of the six-week session.

The “Wild Game Night” themed banquet played off the main course (delicious honey baked pheasant donated by MacFarlane Pheasants) and the evening’s entertainment – audience participation in “wild games” including *Name that Tune*, an interesting version of *Musical Chairs*, and *Family Feud*. The interaction between students and industry executives during the banquet provided a valuable opportunity to become better acquainted and visit about potential employment opportunities within the poultry industry.



Mike Lilburn  
Pullet-zer Recipient.

The evening’s awards ceremony honored Max Pfund, Bob Krenz, and Truc Nguyen as the class clown (Yolkster Award), the most dedicated student (Ducks in a Row Award), and the most intelligent student (Egghead Award), respectively. The Pullet-zer Prize which recognizes the faculty member of the year was awarded to Mike Lilburn of The Ohio State University (nominees included Lou Arrington, Mark Berres, Mark Cook, Scotti Hester, Ron Kean, Sally Noll, Rob Porter, Mark Richards, Bernie Wentworth).  
*Congratulations Mike!*

The evening’s awards ceremony honored Max Pfund, Bob Krenz, and Truc Nguyen as the class clown (Yolkster Award), the most dedicated student (Ducks in a Row Award), and the most intelligent student (Egghead Award), respectively. The Pullet-zer Prize which recognizes the faculty member of the year was awarded to Mike Lilburn of The Ohio State University (nominees included Lou Arrington, Mark Berres, Mark Cook, Scotti Hester, Ron Kean, Sally Noll, Rob Porter, Mark Richards, Bernie Wentworth).

Dr. Mark Richards, COE On-site Coordinator, presented diplomas to COE graduates, students who have completed both years of the COE (see photo).

MPC extends very special thanks to our event sponsors for making the “Wild Game Night” Banquet a success:

- Evonik Degussa
- Gold’n Plump
- Henning Construction
- Hy-Line North America
- Jennie-O Turkey Store
- MacFarlane Pheasants
- Rose Acre Farms
- Sparboe Farms



**2009 COE Graduates:** Front row (L to R): Nancy Warfield, Myah Walker, Truc Nguyen, Shane Mart. Second row (L to R): Melissa Evans, Manny Benitez, Dale Perez, Maggie Lanigan. Third Row (L to R): Lucas Mayfield, Max Pfund, Nathan King, Lauren Bencaz. Back row (L to R): Robert Krenz, Joe Ankley, Jasma Collins.  
*Congratulations to our COE graduates!*

## Students in the News

**James Bailey** (2007-2008) accepted the position of Hatchery Manager with Rose Acres in West Lafayette, IN. James, a 2008 graduate of Purdue University, majored in Animal Science/Production.

**Ashley (Biller) Gardner** (2007-2008) accepted the position of Breeder Field Service Representative with Maple Leaf Farms in Milford, IN. Ashley, a 2008 graduate of Purdue University, majored in Animal Science.

**Kelsey Campbell** (2006-2007) accepted the Leadership Management Trainee position with Gold’n Plump in St. Cloud, MN. Kelsey, a 2009 graduate of the University of Minnesota, double majored in Animal Science, with an emphasis in Poultry Production and Agricultural Industries, and Marketing, with an emphasis in Agricultural Communications.

**Sarah Cook** (2009) accepted the position of Management Trainee with Rose Acres in West Lafayette, IN. Sarah, a 2009 graduate of the University of Missouri, majored in Animal Science.

**Christian Cox** (2005-2006) is employed as a Cut-up Supervisor with West Liberty Foods in West Liberty, IA. Christian, a 2007 graduate of Iowa State University, majored in Animal Science.

**Joseph Dart** (2007-2008) accepted the position of Management Trainee with Rose Acres in West Lafayette, IN. Joseph, a 2008 graduate of the University of Wisconsin-River Falls, majored in Animal Science.

**Ryan Dedloff** (2007) is employed as a Management Trainee with Cal-Maine Foods in Chase, KS. Ryan, a 2008 graduate of Purdue University, majored in Animal Agribusiness.

**Megan Dole** (2008) accepted a Flock Supervisor position with Perdue Farms. Megan, a 2009 graduate of Purdue University, majored in Animal Science.

**Krista Eberle** (2006-2007) accepted the position of Director of Food Safety Programs with United Egg Producers in Alpharetta, GA. Krista, a 2008 graduate of the Purdue University, majored in Animal Science and is completing her Master’s of Science degree in poultry science with emphasis in pre-harvest food safety at Mississippi State University.

**Kody Sok** (2004-2005) is employed as a Poultry Specialist with MBA Poultry in Tecumseh, NE. Kody, a 2005 graduate of the University of Nebraska–Lincoln, majored in Animal Science.

**Alex Ties** (2007-2008) accepted the position of Management Trainee with Sparboe Companies in Litchfield, MN. Alex, a 2008 graduate of Kansas State University, majored in Animal Science.

**Victorianna Walilko** (2007) is employed as a Flock Supervisor with Cargill Meat Solutions in Springdale, AR. Victorianna, a 2007 graduate of Michigan State University, majored in Animal Science.

**Marie Zanton** (2006-2007) is employed as a Brooder Laborer with MacFarlane Pheasants in Janesville, WI. Marie, a 2008 graduate of the University of Wisconsin-Madison, majored in Poultry Science.

# MPRP Midwest Poultry Research Program

The Midwest Poultry Research Program (MPRP) is a public/private project created to effectively address priority research needs of the poultry industry in MPC member states (Colorado, Florida, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin).

The goal of MPRP is to improve efficiency and sustainability of poultry production through integrated, collaborative research and technology transfer. MPRP focuses on priority areas of local need and problems of regional/national scope while encouraging multi-disciplinary research networks which enhance limited state and industry resources. Funding for MPRP is distributed competitively in the following manner: 40% for critical industry needs regardless of species or subject area; 20% for broiler research; 20% for turkey research; and 20% for layer research.

Established in 2001, MPRP received an initial appropriation from Congress of \$400,000. Through the 2009 allocation, **MPRP is now responsible for \$4 million+ in poultry research!** When coupled with industry cash match contributions, MPRP has contributed nearly **\$6 million** to poultry research. This program has been extremely successful in addressing some of the most pressing research needs in the poultry industry, renewing interest among students in poultry research and engaging industry in the research taking place at our member universities.

## MPRP Review Committee Approves Research Projects

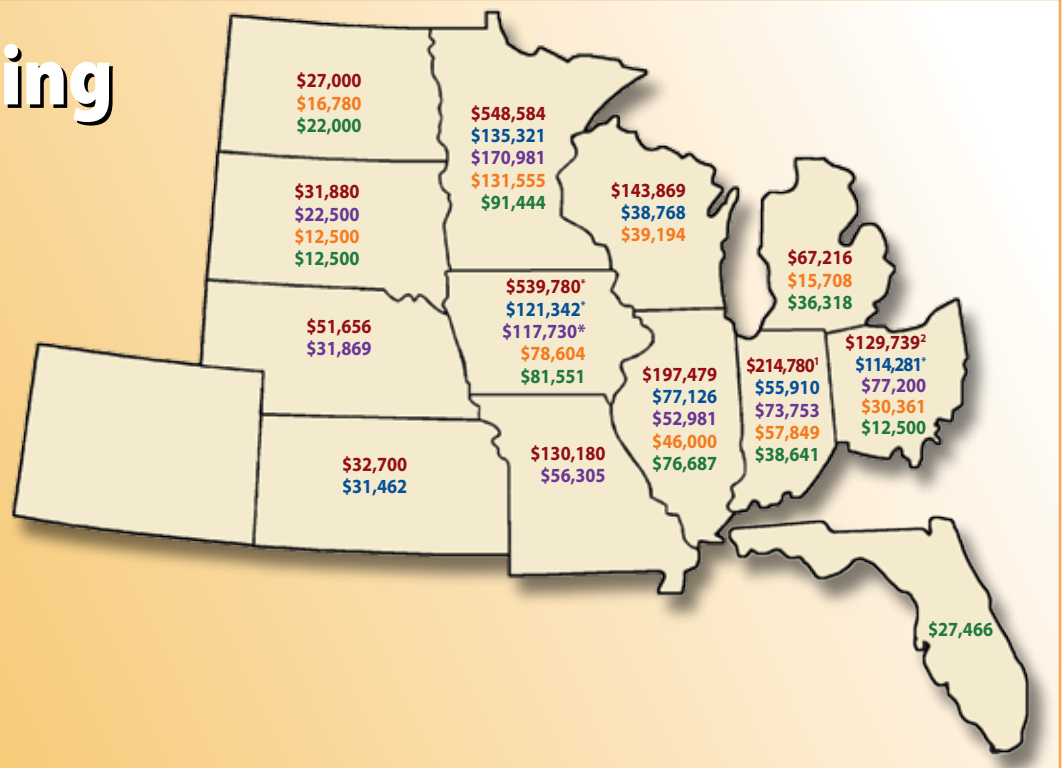
The Midwest Poultry Consortium worked closely with the House and Senate Ag Appropriations committees to maintain funding for the Midwest Poultry Research Program (MPRP) for FY '09. Through those efforts, the MPRP was appropriated \$471,000 for FY09. After USDA overhead and administrative costs were removed, the MPRP had \$399,107 to distribute to research projects. In February, a request for proposals was distributed which generated a total of 32 projects representing 10 of the 14 land grant universities in our Consortium, requesting a total of \$1,245,481. The Review Committee, which met in Minneapolis to allocate funding, had very difficult decisions to make, but ultimately awarded funding to 11 projects, contingent upon USDA and University approval. We would like to specially thank the members of the 2009 MPRP Review Committee for their diligent work in reviewing proposals and taking time out of their busy schedule to join us for the meeting:

## 2009 MPRP Review Committee

- Layi Adeola, Purdue University**
- Richard Balander, Michigan State University**
- Tim Barman, Cooper Farms**
- Bernie Beckman, Hy-Line North America**
- Bruce Behrends, AGRI-TECH**
- Geoff Dahl, University of Florida**
- Gordy Gingras, Evonik Degussa**
- Bill Lanners, Gold'n Plump**
- Brad Lillie, MacFarlane Pheasants**
- Brian McComb, Jennie-O Turkey Store**
- Mike Turk, Maple Leaf Farms**
- Hongwei Xin, Iowa State University**

## MPRP Funding by State

- 02-05 Funding**
- 2006 Funding**
- 2007 Funding**
- 2008 Funding**
- 2009 Funding**



- \*\$50,009 Mississippi State University
- <sup>1</sup>\$1,000 University of California-Davis
- <sup>1</sup>\$1,000 Washington State University
- <sup>2</sup>\$10,000 University of Arkansas
- \* 6,100 University of Maryland
- \*\$18,360 University of Arkansas

## 2008 MPRP Project Summaries

The following summaries are abbreviated versions of the 2008 MPRP reports.

Visit our website for complete reports: [www.mwpoultry.org](http://www.mwpoultry.org)

### Further Evaluation of Feeding Distillers Dried Grains with Solubles in Non-Feed Withdrawal Molt Programs for Laying Hens

U of IL– Koelkebeck, Parsons

**Project Award:** \$18,000

**Cash Match:** \$8,000 (\$2,500 – Dakota Gold Research Association; \$5,500 – JBS United)

**Summary:** The objective of the study was to determine if limit-feeding, varying levels of DDGS with corn, wheat middlings, and soybean hulls, molt diets would yield acceptable postmolt performance in a nonfeed withdrawal molt program for laying hens.

The differences in egg production response among dietary treatments during the molt period might have been due to differences in the energy content of the diets. Scheideler and Beck (2002) recommend a non-fasting molt diet to be a balanced low energy (ME=1,250 kcal/lb), high fiber type ration and the diets used in this study had a higher metabolizable energy level. The DDGS diets in the current study were higher in energy than the C:SH diet, and this resulted in higher feed and energy consumption and less body weight loss than the ad libitum fed C:SH. In contrast to the previous study, the DDGS used in this study was light colored, which is typical of high quality DDGS. The DDGS used in the previous study was dark colored with low lysine digestibility. Fastinger et al. (2006) suggested that a color score of a DDGS sample may provide a rapid method for identifying DDGS sources with poor amino acid digestibility.

There were also some differences in postmolt egg production (weeks 5-40) among treatments, with the C:SH and C:SH:10DDGS diets yielding higher egg production ( $P<0.05$ ) than the C:WM:20DDGS diet. In addition, the C:SH and C:SH:10DDGS yielded numerically higher (4-6%) egg production than all of the other diets containing DDGS. These differences may be related to the length of rest or ovarian/oviduct regression during the molt period. These overall results of the current study indicate that limit-feeding diets containing varying levels of DDGS diets at levels of 65 or 55 g/hen/day during a 28 day molt period did not cause hens to totally cease egg production, did not produce sufficient body weight losses near 25% during the molt period, and did not yield optimum postmolt egg production performance. Thus, lower levels of feed intake may be needed for non-feed withdrawal molting programs that involve feeding diets containing DDGS.

### Further Evaluation of Varying Length Feeding of Prebiotics as Replacement for Antibiotic Growth Promoters

U of IL– Parsons

**Project Award:** \$28,000

**Cash Match:** \$12,000 (\$2,500 – Dakota Gold Research Association; \$9,500 – JBS United)

**Summary:** Experiment 1 evaluated 12 treatments which consisted of feeding chicks a negative control diet or diets containing 5% Grobiotic, 1.2% Dairylac-80 (80% lactose) or 1% pure lactose from 0-

3, 0-7, or 0-21 days of age. Grobiotic and Dairylac-80 were provided by International Ingredients Corporation - St. Louis, MO. Grobiotic is a prebiotic ingredient that contains a mixture of partially autolyzed yeast, yeast extract, dried whey solubles, and citric acid fermentation solubles. Growth performance was not generally affected by dietary treatments, although all dietary supplements generally increased feed efficiency at three days of age. All dietary supplements yielded some beneficial effects on the cecal microflora. All three dietary supplements generally increased bifidobacteria at three and seven days of age. The 1% lactose treatment also significantly reduced cecal *E. coli* at all three ages.

Experiment 2 evaluated 9 treatments which consisted of feeding a negative control corn-soybean meal diet or that diet supplemented with .5% Temulose or .5% partially hydrolyzed or enriched Temulose for 0-3, 0-7 or 0-21 days. Temulose is a hemicellulose by-product which contains high mannose concentrations. The dietary treatments generally had no effects on growth performance. For microbial effects, .5% Temulose increased bifidobacteria at three and seven days of age but there were no other significant effects observed.

Experiment 3 evaluated a new prebiotic, Alternan, which is derived from a reaction between sucrose and maltose catalyzed by an alternansucrase enzyme. Nine treatment diets consisting of an unsupplemented diet or that diet supplemented with 1 or 2% Alternan were fed for 0-3, 0-7 or 0-21 days of age. No consistent effects of Alternan were observed on growth performance or cecal microbial populations. However, feeding Alternan for 21 days yielded small, but significant increases in amino acid digestibility.

Experiment 4 evaluated Elusieve fiber from DDGS as a potential prebiotic. Elusieve DDGS fiber is a high fiber fraction obtained from DDGS by air classification or elutriation. Seven dietary treatments consisted of feeding a corn-soybean meal diet or that diet supplemented with 10% DDGS or 5% Elusieve fiber for 0-3 or 0-21 days of age. An additional diet contained 25 g/ton of bacitration methylene disalicylate. There were generally no effects of dietary treatments on growth performance or cecal microbial populations except that bacitracin reduced microbial numbers.

Results showed short-term feeding of prebiotics such as Grobiotic, Dairylac-80, or lactose for only three or seven days may have beneficial effects on the intestinal microflora of chicks. The effects of the other prebiotics Temulose, Alternan, and Elusieve DDGS fiber were not consistent. Alternan did yield small increases in amino acid digestibility when fed for 21 days. The positive responses to Grobiotic, Dairylac-80 and pure lactose suggest that short-term feeding of prebiotic ingredients containing lactose may be cost effective for improving the intestinal health of very young chicks.

### Production of Ovotransferrin from Egg White for Antimicrobial Application

ISU – Ahn, Lee

**Project Award:** \$78,604

**Cash Match:** \$14,035 (Iowa Egg Council)

**Summary:** Yield of ovotransferrin using the large-scale separation method was 94.39%. The electrophoresis result of the separated and freeze-dried ovotransferrin indicated that purity was also greater than 85%. The yield and purity of the final product indicated the method developed is good enough for large-scale separation of ovotransferrin.

The antibacterial activity of natural apo-ovotransferrin against *E. coli* O157:H7 and *L. monocytogenes* in model systems increased as the concentration of sodium bicarbonate increased. Activation of

ovotransferrin with  $\text{NaHCO}_3$  (100 mM) markedly increased antibacterial activity of ovotransferrin against *E. coli* O157:H7 and *L. monocytogenes*.

*L. monocytogenes* started to grow after 1 day of incubation in the presence of > 2.0 mg/mL of lysozyme alone. The activated ovotransferrin combined with 2 mg/mL of lysozyme groups were bactericidal against *L. monocytogenes*, resulting in one log reduction from initial cell population. Even though activated ovotransferrin with lysozyme showed stronger antibacterial activity than activated ovotransferrin alone, lysozyme itself had no significant antibacterial effect *L. monocytogenes*.

This study suggested that activated ovotransferrin in combination with either EDTA or lysozyme had great potential as natural antimicrobial agents to control *E. coli* O157:H7 and *L. monocytogenes* in broth (model systems). The large-scale separation method developed is simple, economical, compatible for food use, and applicable for commercial preparation of a natural antimicrobial agent for foods. However, studies are needed to find why ovotransferrin and its combinations do not show significant antimicrobial activities in meat products.

### **Femur Spiral Fracturing: Genetic Influence and Femur Composition in Today's Commercial Toms**

MSU - Karcher

**Project Award:** \$51,768

**Cash Match:** \$13,500 (Michigan State University Funds)

**Summary:** The bones from the F line and commercial toms were similar with respect to most of their morphological properties. The cross-sectional area and all moments of inertia were greater in the F line and commercial femurs when compared with those collected from the R2 toms. The moments of inertia were slightly greater in the F line when compared with the commercial turkeys but the area was similar. The general trend in time was similar for all three lines with the area and moments of inertia being greater in the older turkeys. The symmetry index did not change much either within lines or with increasing age. Within the R2 and F line, the lateral cortical thickness of the femur increased initially until the age of 12 weeks, decreased slightly until the age of 16 weeks and then stayed almost constant especially after the age of 20 weeks. Cortical thickness in the commercial bones decreased slightly through 12 weeks, increased through 16 weeks and then remained constant. The lateral cortical thickness, however, was greater in the commercial toms after 16 weeks than in either the R2 or F line which were similar. Cortical thickness increased slightly through 12 weeks then stayed relatively constant for all groups. The cortical thickness was highest in the commercial bones and lowest in the R2. The lateral-medial and posterior-anterior diameter of the femur increased with age. The commercial and F line had similar diameters while the R2 had the smallest bone diameter. The angle between the anatomical axes and principle axes, which is theta, had a large standard deviation but the trend and values were similar for all groups.

While emphasis has been placed on breast yield for genetic selection, the skeletal system has also developed, albeit much slower. Until the mechanical test data and blood marker data is finished being analyzed, it is hard to suggest the genetic influence on femur composition. However, preliminary data suggests the bones of the R2 line are geometrically smaller compared to the F-line and commercial line birds.

### **Development of Immunogens to Protect Against Turkey Cellulitis**

U of MN – Foster

**Project Award:** \$35,741

**Cash Match:** \$11,962 (Minnesota Turkey Research & Promotion Council)

**Summary:** The 7  $\alpha$  toxin-specific fragments were generated by PCR using long oligonucleotide fragments plus sequence-specific forward and reverse primers. Fragments 1, 5, 6, were 186bp in size while Fragment 7 was 204bp. Correctly sized PCR generated  $\alpha$  toxin-specific fragments were ligated into the pQE40 expression vector. Prior to producing recombinant subunit proteins in the expression vector system, it is essential that the open reading frame of each sub-unit be verified. Nucleotide sequence analysis using vector specific primers showed that all 7  $\alpha$  toxin-specific fragments were in frame and should correctly produce the desired recombinant peptides.

### **Market Turkey Response to Dietary Protein as an Energy Source**

U of MN – Noll

**Project Award:** \$26,439

**Cash Match:** \$8,813 (Minnesota Turkey Research & Promotion Council)

**Summary:** Increased protein (lys) level consistently improved body weight at all ages while energy level and DDGS inclusion had no effect. The response of body weight gain to increased protein (lys) level was not consistent at all levels of ME for the 8-11 week period where gain tended to increase with the decrease in ME at the 100% protein (lys) diet but tended to decrease with the decrease in ME at the 110% protein (lys) regimen. At 11, 14, and 17 weeks of age the best body weight was obtained for the 110% protein (lys) level at the 100% ME level.

DDGS inclusion level, diet protein, and energy affected feed efficiency during the various age periods and for the cumulative experimental period of 8-19 weeks of age. Inclusion of 20% DDGS increased F/G during 8-11 weeks and 17-19 weeks of age. Feeding the high protein (lys) diet generally improved F/G while decreasing ME greatly affected F/G. The change in feed efficiency relative to diet energy was due to increased feed intake as dietary energy level was decreased.

Carcass yield and parts were not affected by diet energy level or DDGS inclusion. However, turkeys fed the higher protein (lys) diets had heavier body weights and carcass weight but not when carcass weight was expressed as a percent of live weight at time of processing. Breast meat weight, or as a percent of live weight or carcass weight, increased with the higher protein (lys) level.

In conclusion, the inclusion of 20% DDGS in market tom diets had no negative effects on body weight or carcass yield. Feed conversion was increased slightly (3 points) over the diet series without DDGS. The primary effect of lowering diet ME level was to increase feed intake resulting in a poorer feed efficiency. Increasing diet protein (lys) by 10% resulted in improvements in body weight, feed efficiency, and carcass and breast meat weight.

### **Turkey Cellulitis: Descriptive Epidemiology and Molecular Characterization of Potential Etiological Agents**

U of MN – Wells, Oliveira

**Project Award:** \$69,375

**Cash Match:** \$23,128 (Minnesota Turkey Research & Promotion Council)

**Summary:** While turkey cellulitis has been reported to affect birds as young as 7 weeks old, this study monitored turkey flocks beginning at 6 weeks of age and no birds under 9 weeks of age were detected with cellulitis. A peak prevalence of the disease occurred around 16 weeks of age, followed by a brief decline perhaps due to treatment with antibiotics, which was followed by an increase in cellulitis incidence until time of marketing.

In summary, study results indicated turkey cellulitis is commonly observed in turkey flocks with up to nearly 9% of placed birds affected.



In affected flocks, turkey cellulitis is the most frequent cause of mortality in older birds. Clinical signs most frequently observed in turkeys with cellulitis were subcutaneous emphysema, serum or serosanguineous subcutaneous fluid, and moist dark wrinkled skin especially in the breast or inguinal area. *Clostridium septicum* was identified as the main agent associated with the development of turkey cellulitis. This pathogen was found to be highly clonal and carry the alpha-toxin gene. One single strain was associated with high risk for development of cellulitis. The features that differentiate this specific strain from strains isolated from low risk flocks will be the subject of future studies.

### **Coccidiosis in Game Birds**

NDSU – Gibbs

**Project Award:** \$16,780

**Cash Match:** \$4,375 (North American Gamebird Association)

**Summary:** Coccidia have been isolated from 18 pheasant, 8 Chukar and 20 bobwhite quail flocks, ranging in age from 11 days to 3.5 years. The origin of these isolates included the states of AL, AR, GA, KS, KY, LA, MS, NY, OK, PA, SC, SD, TX, and WI. Considerable work was done with development of PCR molecular techniques for identification, using isolates that were cloned in pure culture as reference strains. The most pathogenic species in pheasants were *Eimeria colchici* and *E. phasianii*; in chukars were *E. kofoidi* and *E. legionensis*. The species in quail have not been determined; researchers are waiting for confirmation by PCR.

A series of chemotherapy tests were conducted with isolates from each species using anticoccidial drugs available for use in chickens. It was determined that some commonly used products, such as amprolium, were not useful. Other products had moderate to good efficacy. Products which have been used extensively, such as lasalocid and other ionophores, had moderate activity, suggesting drug resistance build-up. The most effective products were of the synthetic type, such as Robenz and Decco, which have seen little use in these birds. It is cautioned that the use of these products should be limited, as the potential for drug resistance is high.

Further work on the immune response to coccidia in chukars and pheasants is continuing, with the goal of attenuating strains for use in a vaccine. This will be the main focus of research for the coming year, along with more extensive anticoccidial testing and PCR identification of strains involved in outbreaks. It is likely that such tests will give guidance in the use of existing products to achieve some near-term relief from coccidiosis in production units. Off-label use of such products is permitted by FDA by veterinary prescription. However, there is a dwindling supply of such agents, and past experience has shown that many are marginal in effectiveness for game bird species.

### **Human-Animal Interactions in the Turkey Industry**

OSU – Botheras

**Project Award:** \$7,861

**Cash Match:** \$5,000 (\$2,500 – Cooper Farms;  
\$2,500 – Ohio Poultry Association)

**Summary:** Behavioral testing commenced in June 2009 and was completed in late December 2009. Video analysis is on track to be completed in February 2010. As production records are not fully collated until after the birds are slaughtered (~21 weeks of age), production data on the final groups of birds studied will not be available until at least March 2010. The majority of the blood samples have been analyzed; blood samples from the final groups of birds studied will be analyzed. Once all data has been gathered and collated, data analysis will be possible.

To the author's knowledge, this research is the first of its kind to investigate human-animal relationships in commercially-managed turkeys. This study will provide the first description of the variation between farms in fear of humans in turkeys of different ages. Relationships between fear of humans in turkeys and performance variables will also be investigated.

While such relationships will not demonstrate cause-and-effect, the findings from this study will provide preliminary information on the significance of human-animal interactions in the turkey industry. Such preliminary findings will be used to inform subsequent research needed to demonstrate causal links between human behavior, bird behavior, and bird welfare and productivity. In the long-term, such information can be used in the development of stockperson training programs, which target the key attitudes and behavior of stockpeople which have been found to affect fear of humans in turkeys, and turkey welfare and productivity. Training of stockpeople is becoming an increasingly important issue to address in all of the animal industries, and the potential production benefits of improving the human-animal relationship are also substantial.

### **Incubation Conditions and Bone Integrity in Pekin Ducks**

Purdue – Akkus, Applegate

**Project Award:** \$31,789

**Cash Match:** \$7,950 (Maple Leaf Farms)

**Summary:** After evaluating results, no statistically significant difference was observed between malformed and normal ducks in terms of number of ribs. Also, malformed ducks did not lack symmetry. There was significantly more breast meat at the left side of malformed ducks although both sides had comparable amount of meat in normal ducks. The left side of the keel was significantly wider than right side on malformed ducks at mid-length. Increased meat amount could be due to wider available space for breast meat. Furthermore, there was a marginally significant difference in length between malformed and normal keels ( $P=0.061$ ). Young's Modulus was greater in normal ducks for the ribs #3 ( $P=0.008$ ) and #4 ( $P=0.027$ ) and for other ribs were comparable. A similar result was observed for the yield stress. The difference was significant for rib #3 ( $P=0.013$ ), #4 ( $P=0.045$ ) and #5 ( $P=0.037$ ). In terms of indentation strength, normal and deformed keels were not different ( $P > 0.05$ ). The left side was stronger for normal ducks ( $P < 0.05$ ). Proteoglycan content was not different for malformed and normal keels. No significant difference was observed in terms of appearance of cells neither in the keel and rib nor in connective tissue. Further histology analysis is still in progress. Research systematically studied physical integrity and physiological aspects as related to malformations of the rib in Pekin ducklings. Notably, number and appearance of ribs were similar indicating that it was not an effect of differentiation early in incubation. Rather, physical attributes to the keel (left) and ribs (# 3-5) were affected by the condition leading to a decreased modulus and strength, due plausibly to asymmetry in keel width and resultant muscle mass. Histological examination has not revealed any apparent differences in proteoglycan content, mineral or connective tissue thus far.

### **Regulation of the Growth of Poultry Skeletal Muscle**

SDSU – McFarland; OSU – Velleman

**Project Award:** \$25,000

**Cash Match:** \$6,250 (\$3,125 – South Dakota Poultry Industries Assn.;  
\$3,125 - George & Edna Jaap Poultry Rsch. Fund)

**Summary:** Using serum-free defined medium, previous research demonstrated that turkey satellite cell membrane phospholipid composition could be changed significantly by providing different

fatty acid species to the media formulation. To determine if membrane phospholipid composition and fluidity might alter responsiveness of satellite cells to growth factor stimuli, fibroblast growth factor-2 (FGF-2) was administered at 20 ng/ml in serum-free medium containing one of 8 fatty acids at 5 uM (Linoleic, Stearic, Palmitic, Oleic, Linolenic, DHA, EPA, Arachidonic). With turkey pectoralis major (PM) derived satellite cells, the greatest proliferation compared to zero fatty acid controls was seen in oleic acid (5.0 -fold greater) > linoleic acid (3.7-fold greater) > stearic acid (2.1-fold greater) = palmitic acid (1.9-fold greater). Other fatty acids either supported growth at same rate as control cells or were inhibitory. Cells administered DHA or EPA showed very low proliferation rates and cell health (microscopic observation). With turkey biceps femoris (BF) derived satellite cells, the greatest proliferation compared to zero fatty acid controls was seen in oleic acid (3.9-fold greater) > linoleic acid (2.9-fold greater) > stearic acid (1.5-fold greater) = palmitic acid (1.6-fold greater). Cells administered other fatty acids performed similar to the PM cells receiving those treatments.

To assess effect of fatty acid type on satellite cell differentiation, cells were grown in respective fatty acid containing serum-free media for three days and administered low serum containing medium (3% horse serum) daily for two days to initiate differentiation. DHA and EPA treatments were not applied to differentiation treatments due to poor performance and cell health noted above. Due to scattered myotube lifting and loss, results were somewhat variable between trials. Cells administered linoleic, stearic, palmitic, and oleic acids differentiated to a similar extent as the control zero fatty acid administered cells. Cells administered linolenic or arachidonic acid prior to fusion performed poorly compared to controls. BF satellite cells administered fatty acids and induced to differentiate performed similarly to PM cells, except cells administered linoleic acid consistently differentiated less than controls.

These experiments demonstrate the importance of growth factors and their interaction with the extracellular matrix, especially the proteoglycans, in regulating poultry skeletal muscle growth and development. Recent studies also provide evidence that membrane lipid composition affects gene expression and satellite cell proliferation and differentiation. An improved understanding of how these important components regulate skeletal muscle development in poultry and other meat animals will lead to strategies to increase production efficiency.

### Identifying Causes that Develop the Pink Color Defect in Cooked Ground Turkey Breasts and Red Discoloration of Turkey Thighs Associated with the Bone

U of WI – Claus

**Project Award:** \$39,194

**Cash Match:** \$13,106 (Jennie-O Turkey Store)

**Summary:** To limit the degree of the pink color development, processors should avoid storage of ground turkey, particularly when mixed with salt. Significant amounts of undenatured myoglobin remained even when cooked to 79.4°C. Extending the cooking times would be expected to further denature this pigment. The pink color associated with storage of presalted ground turkey can be reduced by the incorporation of citric acid or calcium chloride, although incorporation of citric acid will increase cooking losses. Use of sodium citrate would offer some control with less of a negative impact on cooking losses. Anatomical location of breast trim does not appear to play a significant role in the generation of a pink defect. Bone marrow constituents have the potential to raise the pH in the surrounding muscle and therefore preserve the red color of myoglobin. However, this may only be of practical significance near artery entrances or with fractured bones.

MPRP Approved Projects FY 2009	MPRP Funds
<b>Anti-Salmonella and Anti-Camp. Properties of Sodium Metasilicate on Comm. Available Ready-to-Cook Broiler Breast Meat and Carcasses Stored at 4±1°C for 12 Days</b> <i>U of FL-Williams</i>	\$27,466
<b>Effects of Feeding Low-Density Diets to Hy-Line W-36 Laying Hens on Production &amp; Profitability</b> <i>U of IL - Koelkebeck, Parsons</i>	\$45,000
<b>Development of Evaluation of a New Precision-Fed Chick Assay for Determining Amino Acid Digestibility &amp; Metabolizable Energy of Feed Ingredients</b> <i>U of IL - Parsons</i>	\$31,687
<b>Enhancing Foaming Properties of Egg Albumen By Using Modified Soy &amp; Egg Proteins</b> <i>ISU-Wang</i>	\$37,396
<b>Assessing Hen Response to Ammonia &amp; Thermal Comfort Combinations via Preference Test</b> <i>ISU - Xin</i>	\$44,155
<b>Comparison of Carcass Appearance, Texture Quality, &amp; Sensory Profile of Broiler Chilled by Air, Evaporative Air, or Water Immersion</b> <i>MSU - Kang</i>	\$36,318
<b>Development of Immunogens to Protect Against Turkey Cellulitis, Part II</b> <i>U of MN - Foster</i>	\$42,333
<b>Energy Value of Corn Co-Products as Affected by Fat and Fiber Components</b> <i>U of MN - Noll</i>	\$49,111
<b>Coccidiosis in Game Birds: Part III</b> <i>NDSU - Gibbs</i>	\$22,000
<b>Regulation of the Growth of Poultry Skeletal Muscle</b> <i>OSU - Velleman; SDSU - McFarland</i>	\$25,000
<b>Determination of Ileal Digestibility of Amino Acids from Feed Ingredients for Laying Hens</b> <i>Purdue - Applegate</i>	\$38,641
<b>Total Research</b>	<b>\$399,107</b>

## 2009 MPRP Project Objectives

### Anti-Salmonella and Anti-Campylobacter Properties of Sodium Metasilicate on Commercially Available Ready-to-Cook Broiler Breast Meat and Carcasses Stored at 4±1°C for 12 Days

U of FL –Williams

**Project Award:** \$27,466

**Objectives:** The project objective is to develop a comprehensive program for controlling Salmonella and Campylobacter in ready to cook poultry, and to provide management and food safety practices for ready to cook poultry that will enhance food safety, efficiency and profitability of retail poultry products.

In order to accomplish this objective, the study will be designed to accomplish the following tasks: 1) Evaluate a USDA approved food additive, sodium metasilicate, for anti-Salmonella and anti-Campylobacter properties in fresh ready to cook broiler breast meat; 2) Determine cost effectiveness and benefit of using the antimicrobial on fresh broiler breast meat; and 3) Develop educational programs and publications for dissemination of information obtained in this study to processors, educators, extension agents, and researchers.

### Effects of Feeding Low-Density Diets to Hy-Line W-36 Laying Hens on Production and Profitability

U of IL – Koelkebeck, Parsons

**Project Award:** \$45,000

**Objectives:** The project objectives are to measure egg-production and economic effects of feeding diets of different nutrient densities to Hy-Line W-36 hens. Specifically, diets formulated to 105, 100, 95, 90, and 85% of the energy and nutrient recommendations in the 2009–2011 Hy-Line W-36 management guide will be fed. Hyline W-36 laying hens will be fed five different nutrient dense diets from 18-70 weeks of age. Egg production, egg quality, body composition, and egg economic evaluations will be monitored throughout the 52-week study.

### Development of Evaluation of a New Precision-Fed Chick Assay for Determining Amino Acid Digestibility and Metabolizable Energy of Feed Ingredients

U of IL–Parsons

**Project Award:** \$31,687

**Objectives:** The project objectives are to: 1) Develop a new precision-fed broiler chick assay to rapidly and accurately determine AA digestibility and TME of feed ingredients; 2) Compare values determined using the new chick assay with those determined using the current ad libitum-fed chick assay and the precision-fed rooster assay; and 3) Evaluate modified precision-fed chick and rooster assays for determining AME, rather than TME.

### Enhancing Foaming Properties of Egg Albumen by Using Modified Soy and Egg Proteins

ISU – Wang

**Project Award:** \$37,396

**Objectives:** The project objectives are to : 1) Synthesize basic proteins from both soy proteins and egg white proteins, so cheaper additives and 100% egg ingredients can be produced for different food applications and to optimize modification conditions for making ethyl esters of the modified protein on pilot plant scale; 2) Evaluate foaming properties by the standard whipping method; and 3) Evaluate foaming properties by testing it in angel food cake and meringues.

### Assessing Hen Response to Ammonia and Thermal Comfort Combinations via Preference Test

ISU – Xin

**Project Award:** \$44,155

**Objectives:** The project objective is to assess the preference of the hen when given the choice of thermal comfort with an elevated ammonia (25-50 ppm) vs. a cooler temperature with much lower ammonia level (<10 ppm).

### Comparison of Carcass Appearance, Texture Quality, and Sensory Profile of Broiler Chilled by Air, Evaporate Air or Water Immersion

MSU - Kang

**Project Award:** \$36,318

**Objectives:** The project goal is to evaluate the effects of three chilling methods on broiler carcass appearance, status/stability of moisture gain (or loss), textural quality, protein functionality, and sensory profiles of breast muscle. The successful completion of this project will provide up-to-date information of air-chilled chicken quality (many European data are outdated) which might help U.S. poultry processors to evaluate the adoption of the air-chill technology in partial or full. The results also could provide consumers with practical and scientific information for the “right decision” on purchasing air chilled products which are expected to grow in popularity.

### Development of Immunogens to Protect Against Turkey Cellulitis, Part II

U of MN -Foster

**Project Award:** \$42,333

**Objectives:** The project objective is to produce 11 different recombinant fusion proteins corresponding to fragments of the a toxin of *Clostridium septicum* which is believed to be one of the causative agents of turkey cellulitis. Up to 200mg of each of the purified recombinant fusion proteins will be produced which will be used in conjunction with an adjuvant to serve as an immunogen when presented to turkeys. Multiple fragments of the *Clostridium septicum* a toxin gene will be expressed in a fusion polypeptide system to avoid producing a biologically active and potentially dangerous exotoxin, which would require biohazard level 3 containment conditions. Additionally, the expression of the *Clostridium septicum* a toxin and its mutant isoforms are covered by an all-encompassing U.S. patent that would be infringed upon if the complete *Clostridium septicum* a toxin or its isoforms were expressed.

### Energy Value of Corn Co-Products as Affected by Fat and Fiber Components

U of MN – Noll

**Project Award:** \$49,111

**Objectives:** The project objectives are to: 1) Determine the metabolizable energy content of modified corn co-products as related to nutrient content determined by in vivo and in vitro methods; and 2) Compare DDGS which vary in fat and fiber content and assess the effect on market turkey performance especially feed conversion.

### Coccidiosis in Game Birds, Part III

NDSU – Gibbs

**Project Award:** \$22,000

**Objectives:** The project objectives are to: 1) Build a library of coccidia strains from the field in order to continue work on immunization; 2) Attenuate selected strains in a manner that has been successful with

chicken coccidia; and 3) Perform an immunization study in bobwhite quail, ringneck pheasants, and chukar partridges to determine if immunization of these birds against coccidiosis is feasible.

### Regulation of the Growth of Poultry Skeletal Muscle

OSU – Velleman; SDSU – McFarland

**Project Award:** \$25,000

**Objectives:** The project objective is to study the role of steroids in the growth and development of poultry skeletal muscle. In particular, the role of testosterone and estradiol will be investigated. Previous studies in cattle have shown that a combination of trenbolone and estradiol implanted into steers increases satellite cell fusion, proliferation rate, and myonuclei numbers compared to control satellite cells. In poultry, only one study by Fennell and Scanes (1992) has assayed the effects of androgen administration on the growth of turkeys. It was reported that growth, including breast muscle weight, was increased and the feed:gain ratio was reduced in turkeys. However, there are no reported studies on the effect of steroids on either turkey or broiler muscle growth and development, satellite cells, or embryonic myoblasts. In this project, the effect of testosterone, estradiol and a combination of testosterone and estradiol will be investigated in both turkey and

chicken satellite cells, and embryonic myoblasts on their proliferation and differentiation rates, and the effect on the expression of genes important to the processes of proliferation and differentiation. The hypothesis is that steroids will affect muscle growth rate in turkeys and broilers by influencing the proliferation and differentiation of myogenic satellite cells and embryonic myoblasts, and affecting the expression of genes associated with these processes.

### Determination of Ileal Digestibility of Amino Acids from Feed Ingredients for Laying Hens

Purdue – Applegate

**Project Award:** \$38,641

**Objectives:** The project objective is to determine the apparent and standardized digestibility from a range of predominate feed ingredients in laying hens with a new consensus protocol. The overall project goal is to begin to establish a laying hen amino acid digestibility database and to compare with data from caecetomized roosters (precision-fed method) and ileal digestibilities from broilers. This project will evaluate a range of ingredient sources including sources of each of the following ingredients: SBM, animal source meals (MBM and poultry by-product meal), DDG(S), corn, canola meal and wheat.

## 2008-2009 MIDWEST POULTRY CONSORTIUM SPONSORS

AgStar Financial Services  
ALPHARMA Animal Health  
American Dehydrated Foods  
Aova Technologies  
Arrington, Lou  
Aviagen  
Aviagen Turkeys  
Big Dutchman  
**Butterfield Foods**  
Cal-Maine Foods  
Cargill Kitchen Solutions  
Case Farms

### Center Fresh/Sioux Cty Egg Farms

**Centurion Poultry**  
ChemGen  
Chick Master  
Chore-Time, an EPS Division  
CHS Foundation  
Cooper Farms  
Danisco Animal Nutrition  
Daybreak Foods

### Decoster Egg Farms

Elanco Animal Health  
**Evonik Degussa Corporation**  
FACCO USA  
Farm Credit Services of America  
Farm Credit Services of Mid-America  
Farmer Automatic of America

Fremont Farms of Iowa  
**Gold'n Plump**  
Handrew  
Henning Construction  
Hidden Villa Ranch  
Hybrid Turkeys  
**Hy-Line North America**  
Hy-Vac  
ILC Resources  
**Iowa Egg Council**  
Iowa Turkey Marketing Council  
IVESCO

### Jennie-O Turkey Store

Katolight by MTU Onsite Energy  
Kemin AgriFoods  
Koechner Manufacturing  
**Land O'Lakes Purina Feed**  
MacFarlane Pheasants  
**Maple Leaf Farms**  
**Michael Foods**  
Michigan Allied Poultry Industries  
Midwest Livestock Systems  
**Midwest Poultry Federation**  
Midwest Poultry Services  
**MN Turkey Research & Promo Council**  
Moore Stephens Frost  
Nebraska Eggs  
Nebraska Poultry Industries

North American Game Bird Assn  
Novus International  
Ohio Poultry Association  
Perdue Farms  
Primera Foods  
Rembrandt Enterprises  
Ridley Feed Ingredients  
**Rose Acre Farms**  
S & R Egg Farm  
Sanovo Engineering  
**Sonstegard Foods**  
South Dakota Poultry Industries Assn

### Sparboe Companies

Tigges, Kent  
Tom-Cin Metals  
Turkey Valley Farms  
**United Egg Producers**  
**University of Florida**  
University of Minnesota  
University of Nebraska - Lincoln  
Vencomatic  
Wabash Valley Produce  
Wells Fargo Bank  
West Liberty Foods  
Willmar Poultry Company  
Wisconsin Poultry & Egg Ind. Assn

**\$ 5,000+ Sponsors • \$10,000+ Sponsors • \$20,000+ Sponsors**

*\*Note: Sponsorships <\$500 are appreciated, but are not listed.*