

POULTRY
RESEARCH
FOUNDATION



THE UNIVERSITY OF
SYDNEY

ANNUAL REPORT 2010

CONTENTS

02	Foundation Objectives
03	President's Report
05	Director's Report
08	Foundation Members
09	Foundation Council Members
10	Poultry Unit Staff and Students
11	Conference Attendance, Acknowledgements and Awards
12	Australian Poultry Science Symposium 2010
13	Foundation Research in Review Current Research Projects
16	Research Collaboration and Industry Services
17	Communications
19	Financial Report and Statements

FOUNDATION OBJECTIVES

OBJECTIVES OF THE FOUNDATION

The objectives of the Poultry Research Foundation are to advise the Senate of the University of Sydney and the Vice-Chancellor on matters associated with poultry research, education and scholarship within the University of Sydney and to provide an interface between the Australian poultry and allied industries and the University.

In doing so, the Foundation shall increase the resources of the University by way of membership to the Foundation and utilising benefits given by members in provision of services and other non-financial contributions.

AIMS OF THE FOUNDATION

1. To provide an interface between the poultry and allied industries in Australia and the University of Sydney.
2. To undertake research of relevance to these industries.
3. To assist in the training of scientific and technical personnel to service the private and public sectors of these industries.
4. To act in an industrial liaison capacity.

PRIORITIES 2010

1. Develop links between the University of Sydney and the Poultry CRC
 - a. Research projects
 - b. Educational programs
 - c. Postgraduate scholarships
2. Develop research projects lead by the Chair of Poultry Science
3. Complete infrastructure maintenance of the Poultry Unit
4. Promote postgraduate opportunities within the Poultry Research Foundation
5. Organise the 2011 Australian Poultry Science Symposium

Management of the Foundation is vested in a Council which comprises the President, Deputy President, Director, Faculty of Veterinary Science Dean and DVC (External Relations)

along with elected Industry Members from the categories of Governors and Executive Members, Honorary Governors and Ex Officio Members.

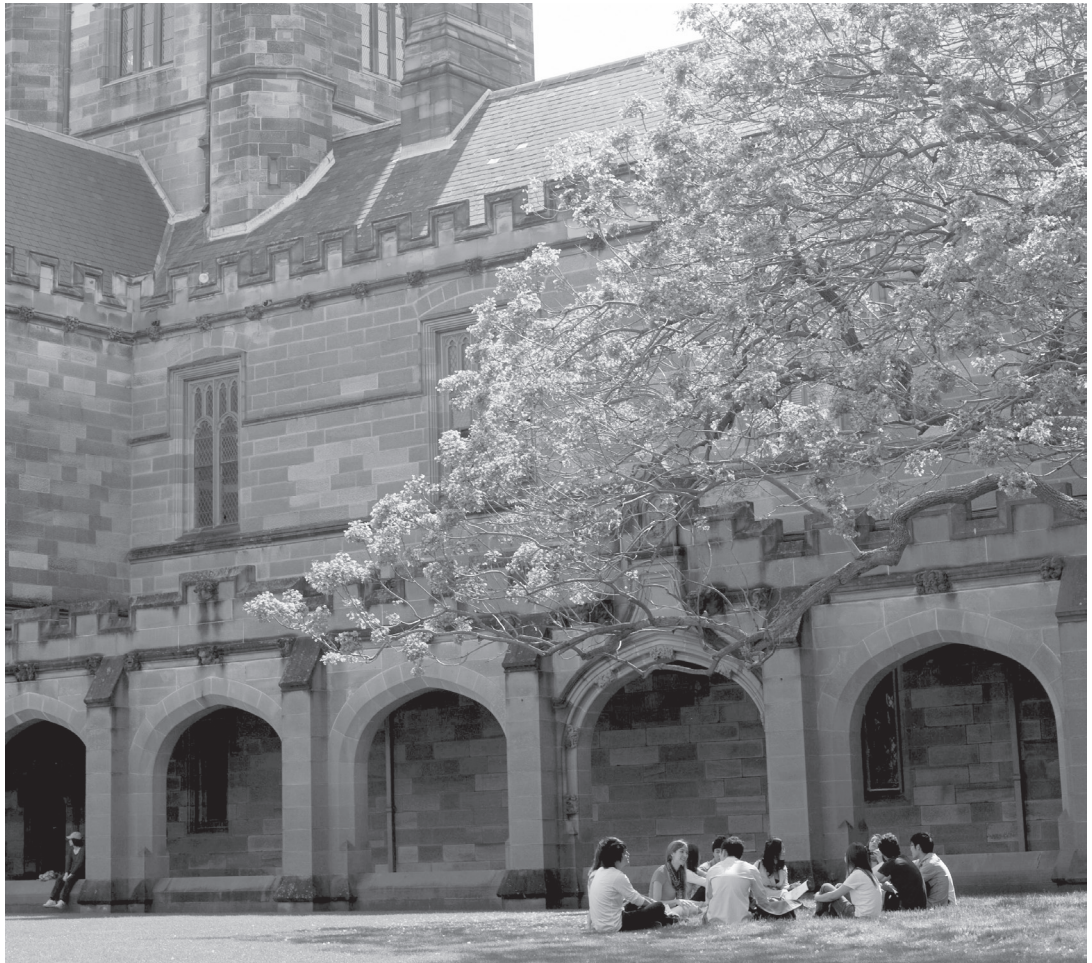
The administrative office and Research Unit are based at Camden.

Faculty of Veterinary Science
University of Sydney
425 Werombi Road
Camden, NSW
2570

CONTACTS:

Jo-Ann Geist, Administrative Assistant
T +61 2 4655 1656
F +61 2 4655 0693
E jo-ann.geist@sydney.edu.au

Dr. Aaron Cowieson, Director
T +61 2 4655 0612
F +61 2 4655 0693
E aaron.cowieson@sydney.edu.au



PRESIDENT'S REPORT

In 2010 an exciting new chapter commenced in the long history of our Poultry Research Foundation with the appointment of Associate Professor Aaron Cowieson on June 1st to the position of Director. Aaron, who is a leading global expert in poultry nutrition, will contribute with great generosity of spirit - leadership, expertise and vision to the leading role within our PRF for the benefit of our Australian Poultry Industry. The successful achievement of Aaron's appointment can be credited directly to Professor/Pro-Dean David Emery and Dr Peter Selle, to whom we sincerely say thank-you, for making it all possible. We also sincerely say thank-you to RIRDC, AECL and Feedworks for

their direct financial support of Aaron in the position of Director.

On behalf of the PRF I wish to express our greatest appreciation to Dr Peter Groves who has been our Acting Director/Director since the departure of Tom Scott early in 2006. Peter has done an excellent job managing our PRF and maintaining its critical role in poultry research. Thank-you Peter for your great efforts through difficult times, you gave your valuable time providing solid guidance based on years of experience. It will be to our PRF's great benefit that you have remained a very active member of the PRF professional team, contributing your irreplaceable expertise, knowledge and

intellect in all matters associated with poultry disease and management.

During 2010 alongside Aaron and Peter, we have been most fortunate to have the highly professional academic and production poultry team of Dr Jeff Downing, Dr Wendy Muir, Dr Peter Selle, Dr Greg Cronin, Jo-Ann Geist, Joy Gill and Mel Hayter. Together they represent the wide diversity of those skills required for a successful research centre of excellence – together they represent expertise in nutrition, disease, immunology, bird welfare, education, poultry production and management and last but not least hard headed commercial savvy.

In 2010, our PRF joined the Australian Poultry CRC as a full partner. Our PRF is now undertaking research projects which are funded by a wide cross section of critically important funding bodies such as the Poultry CRC, RIRDC Chicken Meat Programme, AECL and also commercial companies such as Alltech, Danisco, A.B.Vista and DSM. Aaron and Peter Selle have also in progress a major application for an ARC Linkage grant proposal. Overall during 2010 our PRF has rapidly grown and developed into a significant research partner in our Australian poultry industry, providing a critically important resource across a wide range of commercial interests.

Last year our 2010 Poultry Science Symposium was once again, a great success with 9 high quality invited speakers, 7 from overseas and 2 from Australia. Everyone who attended said it was excellent both academically and socially. The more technical and less commercial emphasis within the conference was positively endorsed by all. I sincerely wish to thank Dr Peter Groves, Jo-Ann Geist, Dr Peter Selle, our sponsors and our organizing committee for such a great conference for 2010.

Our PRF membership is growing with now 22 industry members at the end of 2010 (18 in 2007) with AB Vista, Aviagen and Pfizer joining in 2010. We welcome you and truly hope you find being a member a most worthwhile experience. During 2011 we will be seeking continued growth in membership particularly from egg producers and smaller broiler producers throughout Australia.

The role and mission of our PRF has never been more important! There is an escalating global concern that "climate change" will affect our ability to produce sufficient food in an environmentally sustainable manner. We the poultry industry, produce a protein-rich food resource whether it be meat or eggs, which has one of the smallest ecological footprints of any animal food production system. The poultry industry will be sustainable over the long term, the very long term. We should be proud to be associated with a protein rich food resource which will provide a sustainable and economical food supply for the hungry global population at large. Also we should never forget the simple truth that egg white (albumin) is the highest quality food protein source known to man. In summary the future for our poultry meat and egg producers and their supply partners has never been brighter.

No doubt, many of you may be aware that I have personally undertaken a change in direction. I am now a full time post graduate research student, within the PRF looking at Vitamin D3 and its role with phytase, calcium, phosphorous and strontium on bird leg disease and performance. This major change in my life has been undertaken because I believe in the PRF. I truly believe in the PRF. Please may I say it has been a pleasure working with you over the last 5 years. As I step down from the presidency may I say it has indeed been an honour to be able to serve the

PRF. Thank-you for your wonderful, wonderful support.

In summary, 2010 was the beginning of an exciting new chapter for our PRF. With the combination of Aaron and his strong PFR poultry team alongside him, and with your growing groundswell of support 'our' PRF will become the centre of excellence in poultry research.

Linda Browning

April 2011

DIRECTOR'S REPORT

It has now been 9 months since I took over from Dr. Peter Groves as Director of the PRF and those 9 months have been an exciting learning curve that has not yet begun to plateau!

From a research perspective the PRF has changed dramatically in the past 9 months. We have 3 new post-doctoral research fellows in our group, Dr. Stuart Wilkinson, Dr. Mini Singh and Dr. Yumin Bao. Stuart completed his PhD recently on the effect of fatty acids in pigs and is now working with me on calcium, phytate and phosphorus metabolism in broilers and laying hens. Mini recently completed her PhD in sheep genomics and will shortly start working with me on the effect of mycotoxins on gene expression in broilers. Yumin completed his PhD in trace mineral metabolism in poultry and is now working with me on exogenous enzymes and in vitro digestion models in broilers and layers. We are also lucky enough to have 4 postgraduate students, Linda Browning, Emma Bradbury, Sonia Liu and Tugrul Durali. Linda is supervised by myself and co-supervised by Dr. Peter Groves and is working on leg health, vitamin D and phytase in broilers. Emma is supervised by myself and co-supervised by Dr. Greg Cronin and is working on Ca and phytate metabolism in poultry and feeding behaviour. Sonia is supervised by myself and co-supervised by Dr. Peter Selle and is working on exogenous enzymes and starch and protein digestion kinetics in poultry. Finally, Tugrul is supervised by Dr. Peter Groves and co-supervised by myself and is working on free range broiler production and AGPs. My sincere thanks to the considerable work that these post-docs and PhD students put in and the energy, enthusiasm and commitment they show to their work and to the PRF. My thanks also go to the various commercial companies involved in their sponsorship, specifically Alltech,

Danisco, DSM and AB Vista and also to the Poultry CRC, RIRDC and AECL for their very considerable contribution. As well as the new faces in our team those of us who have been around for a little longer (not sure I fall into that category!) continue our work on Salmonella vaccines, stress in laying hens, duck production, mineral nutrition, sorghum, steam pelleting and bioactive peptides. My thanks to Dr. Peter Groves, Dr. Wendy Muir, Dr. Jeff Downing, Dr. Peter Selle and also to Mr. Todd Gill, Mr. Don Nicholson, Mrs. Joy Gill and Mrs. Mel Hayter for their stalwart efforts. I must also convey sincere thanks to Mrs. Jo-Ann Geist as her workload has increased considerably with the new activities in the group and she continues to deliver high quality results with a smile! The future research activities look bright as a total of 5 FRPs have been submitted to ARC, CRC, RIRDC and AECL on Ca and P metabolism in broilers and layers, phytate interactions in poultry and human nutrition, free range layer production, sorghum and in vitro pepsin digestibility and the effect of incubation conditions on leg health in broilers. In addition to all of the above activities we will run a total of 8 commercially-funded studies in broilers and layers from Dec 2010 to Nov 2011, activities which assist the PRF meet its financial, educational and research commitments as well as to serve our membership in a collaborative manner.

Facilities are busier than ever and occupancy for this year (2011) is close to 100%. The new metabolism cages have finally arrived, expanding our metabolism unit from 96 to 192 cages and giving us improved flexibility. I already plan to purchase another 96 cages in the next few months. We have also recently purchased pen dividers for the deep litter shed, expanding that facility from 48 pens (1.5m x 3.0m) to 96 pens (1.5m²).

These removable stainless steel partitions will give enhanced flexibility for that crucial building. The GC Payne Building is still awaiting repair to the climate control systems (University wheels turn slowly) but as I write I am told that this will happen, at least for 1 of the 10 rooms, in the next 2 weeks. Once these repairs are completed it is my expectation that the remaining 9 rooms will follow but likely at a glacial pace! The GC Payne Building is an extremely useful resource and one that simply must be maintained and available for use for research and teaching. The road network around the poultry unit has received a new blacktop which improves access to the metabolism unit, GC Payne Building and the feed shed and mill. Talking of the mill, we are now confident feed millers in the PRF and have successfully pelleted dozens of diets for our own and other purposes. This resource, for which we received little change from \$300,000 invested, has been a slow starter for us, partially due to our inexperience with its use. However, interest from various commercial companies, the Pork CRC, other Universities and operations within our own Faculty are sufficiently great that the next 6 months will see the recruitment of a mill manager to expand and develop the teaching and research functions of this facility. Future capital investment will be required to expand the storage space for ingredients and finished feed as well as storage of wood shavings. It is also likely that we will invest in the mill by upgrading the recording and monitoring technology and in post-cooler batching and bagging.

Teaching activities also continue with the start of Semester 1 2011 on the 28th February. PRF staff teach into various AVBS units as well as for the Vet students. There are also several 4th year honours projects underway in poultry science, a very good sign

for future postgraduate enrolment. As always, Dr. Wendy Muir has done an outstanding job of leading the undergraduate honours project program and her input is absolutely vital.

The 2011 Australian Poultry Science Symposium was a tremendous success with almost 190 delegates and 19 sponsors. I was delighted with the support we received from our membership and with the quality of the invited speakers and original communications. It is a good problem to have but we were oversubscribed with papers this year and this led to lengthy (and tiring!) sessions. We are putting our thinking caps on for the 2012 meeting to try to reduce the length of sessions, allow people more networking and social time but at the same time maintain the exceptionally high standard of the presentations. Themes for the 2012 symposium are not yet finalised but will likely include sessions on free range poultry production, feed additives and hot topics on laying hens and ducks and feed ingredient quality, cost and supply. I look forward to seeing many of you there. Jo and I are also working on an extra special conference dinner which I am very excited about! Jo – I will have fireworks of our own one year if it kills me!

So what does the next 12 months hold? Well, I see opportunity for the PRF to work more closely with our monogastric colleagues in swine, especially as the Pork CRC gains momentum. The establishment of a sister Foundation on the pig side is not out of the question and raises the medium to long term possibility of a centre of excellence for pig and poultry research and teaching. I also see opportunities to affiliate the PRF with the Centre for Obesity, Diabetes and Cardiovascular Disease (CODCD), a \$400m 'paddock to plate' initiative within the University of Sydney. The projects we are currently

involved in in the area of phytate and zinc homeostasis lend themselves to collaboration with human nutritionists, food businesses and international development agencies. Global deficiencies in zinc and iron are an immediate concern and CODCD have a particular interest in these issues as do some of our friends on the human food side such as Danisco A/S, Associated British Food and our plant breeding colleagues at PBI. This is a fertile area for research, research-led teaching and could contribute substantially to the sustainability of the poultry industry in the future. We are not limited by ideas or even by funding but we are increasingly limited by facilities and support staff and in order to continue to grow, collaborate and improve the next 12-18 months will almost certainly see the need for expansion of our feed shed, cages and perhaps even the building of a new poultry house. It is also increasingly evident that our existing technical and administrative staff needs assistance and we will need to recruit in order to keep ahead of the curve. All good problems to have!

As always, my door is open, please call, email or pop in and exchange ideas. I'm good at making cups of tea and if you are extremely lucky you may even get a chocolate biscuit to go with it!

I wish you and your families well and thank you sincerely for your continued support as members of 'our' PRF.

Aaron Cowieson

April 2011



ADDENDUM TO DIRECTORS REPORT PRF CONFIDENTIALITY AND WORKING PRACTICE STATEMENT

The Poultry Research Foundation within the University of Sydney enjoys considerable support from the poultry industry and allied businesses within Australia and internationally. Many of our members operate in competitive alignment and to some extent conducting sensitive research with the PRF is a strategic risk. Whilst various non-disclosure agreements and more detailed contracts exist it is an inescapable fact that members of staff within the PRF, Veterinary Science Faculty and the University of Sydney in general have some degree of knowledge of the broad portfolio of research that is ongoing within PRF facilities. As Director it is my responsibility, with the assistance of the University of Sydney Foundation Governance framework and the University legal team, to work with as many PRF members as possible, to add value to research and technical programs and yet to establish boundaries for staff and students where strict confidentiality can be assured. It is clear to me that there are certain black and white rules in this regard where, for example, data generated through research commissioned by one party will never be disclosed to anyone outside of the University of Sydney PRF staff and student body without the express

written permission of the original sponsor. However, grey areas exist internally as members of staff within the University have need to discuss ideas and concepts with one another as part of an appropriate research community. It is my intention to ensure that even internally issues of confidentiality and IPR are carefully considered, that research projects within the PRF overlap in discipline as little as possible and that regular communication with the stakeholders is maintained. This addendum is not intended to be a disclaimer but rather a statement of intent and an illustration of our commitment to maintaining membership confidentiality. I would like the PRF to be a network where new concepts and ideas can be shared freely but where professional boundaries are also honoured and where data we generate via the support of one member is not devalued via inappropriate disclosure. The PRF within the University of Sydney is not, of course, unique in this regard, and most Universities globally will work with competing organisations. It is my position that transparency and communication is key, that all PRF members are aware that we assist and support various commercial enterprises via our research facilities but at the same time we conduct ourselves professionally and discretely.

Aaron Cowieson,
April 2011

POULTRY RESEARCH FOUNDATION MEMBERS

GOVERNORS	EXECUTIVE MEMBERS	ASSOCIATE MEMBERS
Baiada	ADM Australia	Alltech Biotechnology
Inghams	DSM Nutritional Products	Aviagen
	Ridley Agriproducts	BEC Fed Solutions
	AB Vista Feed Ingredients	BioMin Australia
	Danisco Animal Nutrition	Cordina Chicken Farms
	Elanco Animal Health	Doxal Australia
	Evonik Degussa Australia	International Animal Health
	Novus Nutrition	Kemin (Aust)
	Phibro Animal Health	The Egg Basket (Sales)
	Pfizer Australia	
	Weston Animal Nutrition	

HONORARY GOVERNORS

Emeritus Professor E. Frank Annison

Dr. Balkar S. Bains

Dr. Derick Balhave

Professor Wayne Bryden

Mr. John Darling

Mr. Ern Newton

* New 3-tier membership structure proposed and ratified at the PRF General Meeting (09/11/2010)

INVITEES

The Deans of Agriculture and Natural Resources

A representative, NSW Agriculture

The President, World's Poultry Science Association (Australian Branch)

The Program Manager, RIRDC Chicken Meat Program

The Program Manager, Australian Egg Corporation Ltd

A representative, Australian Egg Industry Association

The Executive Director, Australian Poultry Industry Association

PRESIDENT	Ms. Linda Browning
DEPUTY PRESIDENT	Ms. Judith O’Keeffe
DIRECTOR	Dr. Aaron Cowieson

GENERAL MEMBERS	UNIVERSITY COUNCIL MEMBERS
AB Vista Mrs. Caroline Oram	Executive Dean – Faculties of Science Professor Rosanne Taylor
ADM Australia Pty Ltd Mr. John McLeish	DVC (External Relations) Professor Andrew Coats
Aviagen Australia Pty. Ltd Dr. Kim Huang	The Pro-Dean and Associate Dean for Research, Faculty of Veterinary Science Associate Professor David Emery
Baiada Poultry Pty. Limited Mr. Greg Hargreave	
Danisco Animal Nutrition Dr. David Cadogan	
DSM Nutritional Products Pty. Ltd Ms. Linda Browning	
Elanco Animal Health Mr. Alex Turney	
Evonik Degussa Australia Mr. Ilia Mendeleil	
Inghams Enterprises Pty Ltd Dr. Ron MacAlpine	
Novus International Pty Ltd Mr. David Watson	
Pfizer Australia Mr. Darryl Meaney	
Phibro Animal Health Mr. Greg Manna	
Ridley Agriproductions Ms. Judith O’Keeffe	
Weston Animal Nutrition Mr. Todd Middlebrook	

**POULTRY
RESEARCH
FOUNDATION
COUNCIL**

POULTRY UNIT STAFF AND STUDENTS

ACADEMIC STAFF

Dr. Aaron Cowieson BTechnol(Hons),
PGDip, MSc, PhD (Aberdeen)
Director Poultry Research Foundation

Dr. P. Groves BVSc. (Sydney) MACVSc.
(Epidemiology) PhD (Sydney)

Dr. W.I. Muir, B.Sc.Agr., PhD (Sydney),
GradDipEd(UNE)

J.A. Downing, WDA (Wagga Agr. Col.),
B.Sc., PhD (Macquarie) Grad. Cert.
Educ. Stud. (Higher Educ. Sydney)

Dr G.M. Cronin, BAgSc (Melb),
MAgrSc (Melb), PhD (Wageningen NL),
Grad. Cert. Educ. Stud. (Higher Educ.)

HONORARY RESEARCH FELLOWS

Dr. P.H. Selle, B.V.Sc, PhD (Sydney)

FACULTY SUPPORT STAFF

Mrs. R.J. Gill

Mrs. M.E. Hayter

FOUNDATION STAFF

Mrs. J. Geist (Administrative Assistant)

POSTGRADUATE STUDENTS

Mr. Mohamed Sayed

VISITING UNDERGRADUATES

(UNDERTAKING A SIX WEEK
TRAINING PROGRAM ASSISTING
WITH INDUSTRY TRIALS)

Ms Marion Belin - University of
Toulouse (Supervisor: Muir/Groves)
A Brooding Study

Ms Florence Vessieres - University of
Toulouse (Supervisor: Groves/Muir)
*An Incubation and Hatching
Temperatures Study*

HONOURS STUDENTS

(CONDUCTED THESIS PROJECTS
UNDER THE SUPERVISION OF THE
POULTRY RESEARCH FOUNDATION)

Ms Briony Green (BScAgr)
(Supervisor: Muir)

*'Identification and Application of
Bioactive Peptides in Meat and Bone
Meal for Improved Growth in Broiler
Chicks'*

Ms Kate Hatcher (BAnVetBioSc)
(Supervisor: Downing)
*'Using egg albumen corticosterone
concentrations to evaluate the role of*

*the glucocorticoids in the production of
abnormal eggs'*

Ms Amber Chen (BAnVetBioSc)
(Supervisor: Downing)

*'The effects of strain, density and
light on feather pecking in commercial
ducks'*

Mr Tom Scott (BAnVetBioSc)
(Supervisor: Downing)

*'A new management strategy to
increase the reproductive rate of
the sow'*

Ms Emily Kearns (BAnVetBioSc)
(Supervisor: Downing)

*'The Behaviour of piglets and lactating
sows during overnight separation'*

AARON COWIESON

Member: Worlds Poultry Science
Association

Member: Poultry Science Association

Member: Embrex Fundamental Science
Award Committee

Chair: Australian Poultry Science
Organising Committee

PETER GROVES

Vice President – Australian Veterinary
Poultry Association

Adjunct Senior Lecturer, Charles Stuart
University – Department Agriculture &
Veterinary Sciences

Adjunct Senior Lecturer, James Cook
University – Veterinary Science

Member: RIRDC Chicken Meat Advisory
Committee

Member: Newcastle Disease Technical
Working Group

Member: National Avian Influenza
Vaccination Expert (NAIVE) group

JEFF DOWNING

Pork CRC Sow Productivity Advisory
Committee

DEGREES AWARDED

DOCTOR OF PHILOSOPHY

Dr. Mohamed Sayed (Supervisor:
Downing)

*'Physiological and nutritional
approaches to alleviate heat stress in
broiler chickens'*



CONFERENCE ATTENDANCE, ACKNOWLEDGEMENTS AND AWARDS

CONFERENCE ATTENDANCE

Australian Poultry Science

Symposium – Sydney February 2010

attended by Drs. Peter Groves, Wendy Muir, Peter Selle, Jeff Downing and Greg Cronin. Presentations were given by Dr. Jeff Downing, Dr. Peter Selle, Dr. Greg Cronin.

Feed QC Symposium, Bangkok,

Thailand – attended by Dr. Aaron Cowieson (presentation given).

International Phytase Summit,

Washington DC – attended by Drs. Aaron Cowieson and Peter Selle (presentations given).

Feedworks Nutrition Symposium

(Coolum, Qld) – attended by Drs. Aaron Cowieson and Peter Selle (presentations given).

Australian Egg Industry Forum

(Adelaide) – attended by Dr. Aaron Cowieson (presentation given).

Commonwealth Government and Poultry Industry Biosecurity Workshop, Sydney, June 2010

– attended by Dr. Peter Groves

New Zealand Poultry Industry

Conference, Palmerston North, NZ.

October 2010 – attended by Dr. Peter Groves

Australasian Veterinary Poultry

Association scientific meeting,

Christchurch, NZ. October 2010 –
attended by Dr. Peter Groves

ACKNOWLEDGMENTS & AWARDS

Monetary support is given to the Veterinary Science Postgraduate Conference annually.

AUSTRALIAN POULTRY SCIENCE SYMPOSIUM 2010

The 21st Annual Australian Poultry Science Symposium was held 1st-3rd February, 2010. The Poultry Research Foundation in conjunction with the World's Poultry Science Association (Australian Branch) organised this combined meeting which presented valuable information under the theme of "Poultry Production in a time of Global Uncertainty" this covered subjects of Innovations in European poultry production along with Nutrition systems beyond ME, Broiler performance and nutrition, Layer Nutrition, Welfare and Food safety, Behaviour, Housing and Health, Global goals to promote poultry production in developing countries and Commercial. We had six internationally acclaimed speakers and two local authorities who presented their recent research outcomes and concepts for a crowd of approximately 150 attendees, which included a group sponsored by WPSA to attend from developing nations such as Papua New Guinea, Tonga, Solomon Islands and Timor Leste. In total, there were 51 contributed and invited speaker papers presented.

Invited speakers were:

- Mr. Peter Brown - Pepe's Ducks - NSW
- Dr. Phil Glatz - SARDI - SA
- Dr. Koen De Reu – Wageningen University, Netherlands
- Dr. Loek de Lange – de Heus, Holland
- Dr. Birger Svihus – Norwegian University of Life Sciences, Norway
- Dr. Jean Noblet - INRA, France
- Dr. Jan Dirk van der Klis – Schothorst, Netherlands
- Professor Rob Gous - University of KwaZulu-Natal, South Africa

Sponsorship of the APSS 2010 was kindly supported by:

Invited Speaker Sponsors

AECL Egg Program
Poultry Research Foundation
RIRDC Chicken Meat Program

Gold Sponsors

Australian Poultry CRC
DSM Nutritional Products Pty. Limited
Feedworks / Danisco
Phibro Animal Health / Alpharma Animal Health

Silver Sponsors

ADM Australia Pty. Limited
Alltech Biotechnology Pty. Limited
Evonik Degussa Australia Pty. Limited

Bronze Sponsors

Baiada Poultry Pty. Limited
BEC Feed Solutions
Biomim Australia
Elanco Animal Health
International Animal Health
JEFO Australia
Kemin (Aust) Pty. Limited

Alternative Sponsors

Kemira
Zootechny Pty. Limited

FOUNDATION RESEARCH IN REVIEW

The Poultry Research Unit has been very active in both the broiler and layer research fields for more than 50 years here at Camden. Some major contributions to research and industry during this time have been in the areas of:

1. Amino Acid Digestibility Studies (RIRDC)
2. Modulation of lean tissue deposition by dietary fatty acids (RIRDC; ARC)
3. Development of a non-invasive test for stress in laying hens (RIRDC)
4. Mucosal immunity in chickens (RIRDC)
5. Nutritional and toxicological evaluation of transgenic plants (CSIRO Division of Plant Industry)
6. Application of feed enzymes (Industry)
7. Mycotoxins in poultry feeds (ADAB)
8. Egg Shell Quality (RIRDC)
9. Amino acid balance for heat stressed broilers (Industry)
10. Nutritional requirements of recently imported layer stock (RIRDC)

We will continue to serve the needs of research, industry and teaching over years to come.

CURRENT RESEARCH PROJECTS

DR. AARON COWIESON:

Aaron joined the PRF in June 2010 and so as of the end of 2010 does not have any category 1 grants in place. However, research during 2010 included:

1. Commercially-funded post-doctoral project to investigate the antinutritive effects of phytate in commercial broilers.
2. Effect of betaine in the diets of laying hens.
3. Effect of commercial feed enzymes and interactions with wheat quality and hardness.

4. Collaboration with Dr. Peter Selle on the effect of steam pelleting on the nutritional value of sorghum for broilers.

As of end 2010, Dr Cowieson has submitted 3 full research proposals to the RIRDC, AECL and ARC Linkage.

DR. PETER GROVES:

During 2010 Dr Groves has been involved with the following research

1. AECL Project No: 1US091 "*Salmonella* control in commercial layer flocks". This two year project looks at approaches to reduction in intestinal colonisation of layer chickens by *Salmonella* with the use of a live and an inactivated vaccine in various combinations. Two flocks, one floor reared and the other reared in cages were established and birds are challenged at various ages to determine vaccine efficiency and duration of immunity. The challenge model was adjusted and is giving more consistent results. Several of the most promising vaccination regimes have been selected and applied to birds which will undergo further challenge studies. The aim is to determine the most cost effective approach for use by the egg industry in controlling *Salmonella* colonisation of hens.
2. Poultry CRC Project No. 09-24 "Effects of incubation differences on broiler chicken skeletal integrity". This was a short term scoping study for the CRC working with Dr. Wendy Muir. It evolved from a field observation of differences in chick leg strength following a variation in incubation conditions. The approach was to try to recreate this observed difference compared to an "ideal" incubation profile. The original experiment which had problems with the control incubator was repeated and consistent findings of effects of the incubation variations on subsequent broiler leg strength were confirmed. The

Foundation has purchased four new small scale incubators to continue these studies and application for funding these has been made to RIRDC.

Also currently supervising two external students, 1 PhD and 1 Master of Philosophy through the University of NSW in association with Professor Julian Cox.

DR. WENDY MUIR:

During 2010 Dr Muir has been involved with the following research

1. Meat and Livestock Australia project A.COP.0047: *Strategies to identify and develop bioactive peptides in meat and bone meal (MBM)*: Screening for peptides in several samples of meat and bone meal has been completed. A technique for the isolation of peptide fractions from the meat and bone meal samples has been established. Initial chick studies assessed the effect of *in-ovo* delivery of peptide fractions on early chick growth and performance. In the later part of 2010 the peptide fractions were delivered to young chicks during the early post-hatch period, and their subsequent growth and performance was assessed.
2. An Australian Poultry CRC strategic research project No. 09-24 investigating the "*Effects of incubation differences on broiler chicken skeletal integrity*" with senior investigator Dr Peter Groves. Dr Groves has outlined the main findings of this work in his report.
3. "*Salmonella control in commercial layer flocks*" (AECL Project No: 1US091) with senior investigator Dr Groves is also outlined under his report. All mucosal samples have been processed and preserved for analysis. Work to optimise the ELISA assay to measure the intestinal immune response to *Salmonella typhimurium*

following vaccination, has been ongoing.

DR. JEFF DOWNING:

Dr Jeff Downing continued work on the following research projects in 2010

1. RIRDC Chicken Meat. Project No: US152A 'Physiological and nutritional approaches to alleviate heat stress in broiler chickens.' This project was completed in 2010 with the final report submitted in November and now accepted by RIRDC. The project was extended for 6 months to allow for a study investigating the role of dietary electrolyte balance on performance of broilers during high temperature. Providing the electrolytes in feed improved performance under high temperature as did extra electrolytes in water.
2. A new RIRDC New Animal Industries- (Project No: PRJ 003776) commenced in 2010. 'Improving the production efficiency, welfare and processing of commercial ducks.' Two studies were completed in 2010. The first was in summer and it investigated various strategies to alleviate the poor performance of ducks during high temperature. The only successful treatment was the provision of electrolytes in water. The second study looked at the effects of light intensity bird density and strain on feather pecking.
3. AECL project US 108 continued throughout 2010. In this project the corticosterone concentration in egg albumen is being determined as a non-invasive measure of stress in hens maintained in different housing systems. Egg collection and assaying of samples continued from the flocks involved. A total of 12 flocks have been sampled from (three barn, five free range and four cage).
4. Work continues with funding from the Pork CRC on the induction of

oestrus during lactation in sows. This work formed a significant part of the Pork CRC successful rebid as it was a foundation part of the commitment to remove sows from stalls.

DR. PETER SELLE:

Dr Selle continued his involvement in sorghum as a feedstuff for broiler chickens. A review paper entitled 'Implications of sorghum in broiler chicken nutrition' was published in *Animal Feed Science and Technology* and Peter was invited to submit a review paper to a special 'sorghum issue' of *European Journal of Plant Science and Biotechnology*, which has the provisional title 'Application of grain sorghum in animal nutrition: An overview'.

The pepsin digestibility of sorghum is uniquely vulnerable to 'wet-cooking', which is attributed to the formation of disulphide cross-linkages, particularly in the β - and γ -kafirin fractions located in the periphery of protein bodies. In sorghum endosperm, starch granules are intimately associated with protein bodies (kafirin) and the protein matrix (glutelin) and the induction of disulphide cross-linkages by wet-cooking may depress both protein/ amino acid and starch digestibility. Therefore, a critical issue is whether or not steam-pelleting sorghum-based broiler diets at $\sim 90^{\circ}\text{C}$ constitutes sufficient 'moist-heat' to compromise protein and starch availability.

Presently, Peter Selle is the Principal Investigator of a RIRDC Chicken-meat project to investigate the effects of steam-pelleting temperatures of sorghum and sorghum-based diets on growth performance and nutrient utilisation in broilers. Following the installation and commissioning of the new Palmer steam-pellet press and ancillary equipment within the Camden Campus the first feeding study in this project was completed late last



year. It should be noted that this would not have been possible without the generous guidance of Bradley Hopkins of Ridley AgriProducts and his assistance is greatly appreciated.

During 2010, Peter completed two contract R&D projects for Danisco Animal Nutrition. One involved the evaluation of a xylanase feed enzyme in broiler diets based on four wheats with differing textures and viscosities. The second involved the evaluation of a protease feed enzyme individually, and in combination with phytase, in sorghum-based broiler diets.

Also in 2010, Peter Selle was invited to present a lecture at the first International Phytase Summit in

Washington, DC. This conference was organised by University of Maryland, Massey University, The University of Sydney and AB Vista.

DR. GREG CRONIN:

Together with Ms Karen Williams, we conducted a behaviour study on feather pulling behaviour by ducks of two genetic lines housed under two stocking densities. The observations were conducted within the constraints of a larger experiment on the growth of ducks by Dr. Jeff Downing.



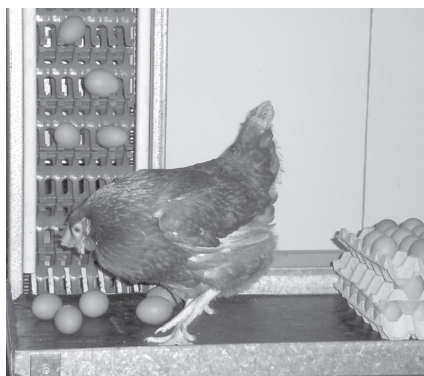
RESEARCH COLLABORA- TION AND INDUSTRY SERVICES

Drs. Cowieson and Selle continue their research collaboration with Prof. Ravi Ravindran at Massey University, Dr. Dave Cadogan from Feedworks and Dr. Alex Peron from Danisco. Collaborative projects established in 2010 also included a program with Dr. Mike Bedford from AB Vista Feed Ingredients.

COMMUNICATIONS

PUBLICATIONS:

- Bedford, M.R. and **Cowieson, A.J. (2010)** Use of proteases in corn-soya diets. *Feed International*, May 2010.
- Bedford, M.R., **Cowieson, A.J.** and Wyatt, C.L. (2010) Influence of dietary Ca level and phytase application in low AvP diets on performance and digestibility of P and Ca in broiler chickens. *Poultry Science*.
- Blaney, B.J., McLennan, S.R., Kidd, J.F., Connell, J.A., McKenzie, R. A. and **Downing, J.A. (2010)** Effect of sorghum ergot (*Claviceps Africana*) on the performance of steers (*Bos Taurus*) in a feedlot, *Animal Production Science*, 51, 156-166.
- Cowieson, A.J. (2010)** Strategic selection of exogenous enzymes for corn-based poultry diets. *The Journal of Poultry Science*, 47: 1-7.
- Cowieson, A.J.**, Bedford, M.R. and Ravindran, V. (2010) Interactions between xylanase and glucanase in corn-soy-based diets for broilers. *British Poultry Science*, 51: 246-257.
- Cowieson, A.J. (2010)** Composition and nutritional value of corn. *Asian Feed*, July/August, 2010.
- Cowieson, A.J. (2010)** Aggressive modern enzymes require review of diet formulations. *All About Feed*, 1: 24-26.
- Cowieson, A.J. (2010)** Corn nutritional value, composition analysed. *Feedstuffs*, 82: 1-3.
- Cowieson, A.J.**, Bedford, M.R., **Selle, P.H.** and Ravindran, V. (2010) The role of sodium in the physiological response of growing broilers to phytate and phytase. *Poultry Science*.
- Cronin G.M.**, Borg S.S., Storey T.H., **Downing J.A.** and Barnett J.L., (2010). The effects of two light- dark schedules on egg laying time and synchrony, the incidence of laying in the dark and hen welfare. *Proceedings, Australian Poultry Science Symposium* 21: 130-133.
- Cronin G.M., (2010)**. Nest boxes for laying hens and their effects on hen behaviour and stress physiology. *Proc. Animal Welfare Science Centre Poultry Welfare Research Seminar*, 29th October 2010, Attwood Vic., p. 5.
- Downing, J.A.** and Taylor, W. (2010) The effects of strain and season on the performance of commercial ducks under Australian conditions. *Proceedings of the Australian Poultry Science Symposium*, 21, 182-185.
- Downing, J.A.** and Ischan, I. (2010) The performance of commercial ducks fed different dietary protein concentrations during the finisher phase. *Proceedings of the Australian Poultry Science Symposium*, 21, 186-189.
- Groves, P.J. (2010)**. Spotty Liver survey of Australian layer farms. *Proceedings of AVPA scientific meeting*. Gold Coast, May.
- Groves, P.J. (2010)**. The evolution of poultry disease. *Proceedings of the New Zealand Poultry Industry Conference*. Palmerston North, New Zealand. October.
- Laine S.M., **Cronin G.M.**, Petherick J.M. and Hemsworth P.H., (2010). The effects of interrupting a dustbathing bout on the choice behaviour of laying hens in a Y-maze test. *Proceedings, Australian Poultry Science Symposium* 21: p. 85.
- Lehman, R.N., **Cowieson, A.J.** and McElroy, A. (2010) Broiler response to increasing dietary phytic acid concentration during a live coccidia oocyst vaccination. *Proceedings of the International Poultry Scientific Forum*, Atlanta, GA, January 2010.
- Lehman, R.N., **Cowieson, A.J.**, Walk, C.W. and McElroy, A.P. (2010) Intestinal histology and amino acid digestibility of broilers fed increasing dietary phytic acid during a live coccidian vaccination. *Poultry Science*.



Olukosi, O.A., **Cowieson, A.J.** and Adeola, O. (2010) Growth performance and nutrient utilization responses to supplementation of individual or combination of phytase and cocktail of carbohydrases and protease in corn-soybean meal diets with or without DDGS for broilers. *British Poultry Science*, 51: 434-443.

Pavic, A., **Groves, P.J.** and Cox, J.M. 2010. Utilization of a novel autologous killed tri-vaccine (serogroups B [Typhimurium], C [Mbandaka] and E [Orion]) for *Salmonella* control in commercial poultry breeders. *Avian Pathology* 39(1): 31-39.

Pavic, A., **Groves, P.J.**, Bailey, G. and Cox, J.M. 2010. A validated miniaturized MPN method, based on ISO6579:2002, for the enumeration of *Salmonella* from poultry matrices. *J. of Applied Microbiology*. doi:10.1111/j.1365-2672.2009.04649.x

Sayed, M. and **Downing, J. A.** (2010) The effects of water replacement by oral rehydration fluids with or without betaine supplementation on performance, acid-base balance and water retention in heat stressed broiler chickens. *Poultry Science*, 90, 157-167

Selle, P.H. and Cowieson, A.J. (2010) The negative impact of phytate on protein utilization. *Proceedings of the 1st International Phytase Summit*, 66-70.

Selle P.H., Cadogan D.J., Li X. and Bryden W.L. (2010) Implications of sorghum in broiler chicken nutrition. *Animal Feed Science and Technology* 156, 57-74.

Selle P.H., Gill R.J. and Downing J.A. (2010) The vulnerability of sorghum to 'moist-heat'. *Proceedings, Australian Poultry Science Symposium* 21, 68-71.

Selle P.H., Cadogan D.J., Ru Y. and Partridge G.G. (2010) Impact of exogenous enzymes in sorghum- or wheat-based broiler diets on nutrient utilisation and growth performance.

International Journal of Poultry Science 9, 53-58.

INVITED PRESENTATIONS:

Cowieson, A.J. (2010) Recent developments in the use of exogenous enzymes in poultry nutrition. Pig, Poultry and Dairy Focus Asia, Bangkok, Thailand, March 2010.

Cowieson, A.J. (2010) How to integrate enzymes into your formulation values. Feed Quality Conference, Kuala Lumpur, Malaysia, August 2010.

Cowieson, A.J. (2010) Interactions between feed additives, digestibility, and the re-formulation of diets. *The Coolum 2010 Nutrition Workshop*, Coolum, September 2010, Australia.

Graham, H., Chee, S.H. & Cowieson, A.J. (2010) The application of feed enzymes. *Philsan Annual Conference, Philippines*, October 2010.

Selle, P.H. & Cowieson, A.J. (2010) The negative impact of phytate on protein utilization. *1st International Phytase Summit, Washington DC, US*, September 2010.

Selle P.H. (2010) Living with sorghum – A 'moving-target' challenge for monogastric nutritionists and mill managers. *Feedworks Nutrition Workshop*. Coolum, Qld.

Selle P.H. (2010) Over and above 'standard' phytase inclusion rates. *Feedworks Nutrition Workshop*. Coolum, Qld.

FINANCIAL REPORT AND STATEMENTS

My final paragraph in last year's report was that we would hopefully finish "within budget" for the end of 2010's financial year, unfortunately that was not to be, as you will note on the Income Statement we had a deficit of \$ 29,521. The bulk of this can be explained by way of the University's new accounting policy whereby income and expenses are to be recorded for the year to which they belong, which has not previously been the case with our figures, APSS has always overlapped. APSS 2011 had received prior to the end of 2010 over \$ 26,600.00 of income that had to be transferred out into 2011 figures along with \$5,000.00 worth of expenses. So, overall I don't think we are in too bad a position.

As you have heard from the President's and Director's reports, 2010 has been a very busy year. We had more costs associated with Pellet Mill to get it to the stage of being able to produce our own product, the total spent in 2010 was over \$ 30,000.00, this included equipment such as an auger, compressor and a touch screen control panel along with all the electrical installation costs, as well as the diesel and other items such as tools etc for the maintenance of the mill and boiler. Other major purchases included in the Equipment, Repairs and Maintenance figure on the Income Statement was a new laptop to update my old one and one for Stuart Wilkinson taking up a new Post Doc position, some data loggers and new wheelbarrows for the sheds. Repairs were made to the centrifuge in the lab and the old Massey Ferguson tractor and alterations were made to rooms in the environmental building and some custom made partitions the deep litter shed.

Salaries increased due to Aaron taking up the position of Associate Professor and Director in July along with Stuart commencing his Postdoctoral Research

Associate position in November. We also supported Dr. Peter Groves till the end of the year at .2 to finalise some of the projects that he had running with the Unit and to assist Aaron in "settling in". My salary of course and some casual labour required for the sheds is also included.

The Symposium income and conference and entertainment expenses were down on last year due to the previously mentioned new accounting practices. This should be back to normal next year.

The Membership total should have included a late invoice raised in 2010 that did not appear till 2011 to the total of \$5,980.00 which would have put our actual figure at \$59,747.00. This increase was due to 3 new members joining in 2010 and the amalgamation of Baiada Pty. Limited and Bartter Enterprises.

Business Medical Testing and Other Income are explained in Notes 2 & 3 found on the Balance Sheet page.

Jo-Ann Geist

**The University of Sydney
The Poultry Research Foundation**

Income Statement
for the year ended 31st December 2010

	Notes	2010 \$	2009 \$
INCOME			
Business and Investment Income		33,335	25,276
Memberships and Subscriptions		53,767	55,020
Symposium Income		64,393	118,594
Business Medical Testing Income	2	28,973	-
Other Income	3	126,954	14,286
Total Income		307,423	213,176
EXPENDITURE			
Salaries		190,374	117,060
Consumables		16,830	8,099
Equipment and Repairs / Maintenance		56,536	6,945
Services and Utilities		6,861	3,565
Travel, Conferences and Entertainment		45,578	68,565
Contributions to University areas		737	1,200
Other Expenses		20,027	9,315
Total Expenditure		336,944	214,750
SURPLUS / (DEFICIT)		(29,521)	(1,573)
Accumulated Funds as at 1st January		178,879	180,452
ACCUMULATED FUNDS AS AT 31ST DECEMBER		149,358	178,879

I certify that the Income Statement and Balance Sheet of the Foundation have been prepared in accordance with the University's accounting practices and procedures. These Foundation accounts form part of The University of Sydney's financial reports which have been audited by the Auditor-General, New South Wales.



Greg Robinson
Finance Director
Faculties of Sciences, Engineering and Technology
22nd February 2011

The University of Sydney
The Poultry Research Foundation

Balance Sheet

as at 31st December 2010

	Notes	2010 \$	2009 \$
ASSETS			
CURRENT ASSETS			
Receivables		4,961	-
Deposit		69,988	-
Funds Participating in University Pool Interest		101,027	178,879
Total Current Assets		175,976	178,879
TOTAL ASSETS		175,976	178,879
LIABILITIES			
CURRENT LIABILITIES			
Payables		26,618	-
Total Current Liabilities		26,618	-
TOTAL LIABILITIES		26,618	178,879
NET ASSETS		149,358	178,879
EQUITY			
Accumulated Funds		149,358	178,879
TOTAL EQUITY		149,358	178,879

Notes to the Financial Statements as at 31 December 2010

1. Accounting Policies

(a) Basis of Accounting

The Financial Statements have been prepared on a modified accrual accounting basis.

(b) Fixed Assets

All fixed assets are expensed in the year of purchase.

(c) Income Tax

The University (including the Foundations) is exempt from income tax.

2. Business Medical Testing Income re. lab analysis performed on behalf of a Research project.

3. Other Income includes the uptake of \$69,988 for partial support of a 4-year Post-Doctorate appointment. Funds receipted by the University in December 2010, but mis-credited by the Central Cashier Office.



The University reserves the right to make alterations to any information contained within this publication without notice. UPS50683

ABN 15 211 513 464
CRICOS 00026A