

Annual Report 2015



Canadian Poultry
Research Council

Le Conseil De
Recherches Avicoles
Du Canada

About the CPRC

The creation of the Canadian Poultry Research Council (CPRC) follows the recommendation of a report commissioned by the Canadian Agri-food Research Council and the Canada Branch of the World's Poultry Science Association. This report assessed the needs and resources of Canada's poultry sector with respect to research, education and technology transfer. It also documented the rapid erosion of both human and physical resources and the loss of federal funding for poultry research.

In response to the concerns and recommendations outlined, the five national poultry organizations met to discuss the need for a national organization devoted to addressing national poultry research concerns. In November 2001, the CPRC was formally established.

The CPRC members are:

- Canadian Hatching Egg Producers
- Canadian Poultry and Egg Processors Council
- Chicken Farmers of Canada
- Egg Farmers of Canada
- Turkey Farmers of Canada

Each Member elects annually a representative to serve on the CPRC Board of Directors.

Mission Statement

CPRC's mission is to address its Members' needs through dynamic leadership in the creation and implementation of programs for poultry research in Canada, which may also include societal concerns.

This mission focuses on:

- The coordination and enhancement of a more efficient Canadian poultry research effort.
- Securing additional and matching funding.
- Facilitating the establishment of national poultry research priorities.

2015 Board of Directors

Roelof Meijer (TFC)
Chairman

Timothy Keet (CFC)
Vice-Chair

Cheryl Firby (CHEP)

Erica Charlton (CPEPC)

Helen Anne Hudson (EFC)

Staff

Bruce Roberts, Ph.D.
Executive Director

Sandra Quade
Research Administrator

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Message from the Chair

2015 was my third and final year as CPRC Chair. I will be leaving the CPRC Board in March 2016 after seven years as a member. I have enjoyed my time on the Board, particularly working with other Board members, their support staff from our member organizations and CPRC staff.

The year brought a new staff member to CPRC in recognition of the increasing activity and the greater work load that created. At year end, CPRC had 31 active projects with an additional 10 awaiting full funding, which are expected to commence research activities in 2016. Sandra Quade was hired to fill the new position of Research Administrator freeing up time for CPRC's Executive Director to focus on planning and development. CPRC member organizations increased their operating contributions to support the new position.

The Board decided that it was time to update CPRC's website and funds to do so were included in the 2015 budget. The new website is expected to be active in March 2016. Content is similar to the present website but the format has been modified and a members-only section has been added to facilitate communication among Board members, member organization support staff and CPRC staff. The new website is designed to work seamlessly with hand-held devices such as smart phones.

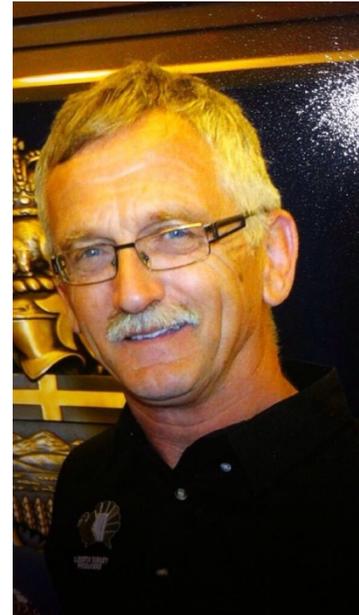
I would like to thank the many people that made 2015 a successful year. These include the Executive Committee, CPRC staff, CFC who provides office space and administration support at the Ottawa office, and Dr. Fred Silversides who, though retired, continues to assist with technical administration of the Cluster and other projects. We would also like to thank Dr. Nerine Joseph who began providing additional contract technical support in early 2015. Dr. Joseph has worked closely with CPRC staff to standardize research content for the new website. Thank you as well to the members of the Scientific Advisory Committee, the Cluster Scientific Advisory Board and the Poultry Welfare Centre Steering Committee for your invaluable time and support.

I would also like to thank our member organizations for their very strong support for CPRC's activities, both financially and through input from their Board representatives and the staff members who support them. It is this type of cooperative effort that has allowed CPRC to accomplish its research goals and that will help sustain and enhance a strong Canadian research program as we move forward into the future.

Respectfully submitted,



Roelof Meijer, Chairman





Structuring an organization that is stable and focused on results

Board of Directors

The CPRC is governed by a Board of Directors representing each of the five member organizations.

Roelof Meijer is CPRC's Chairman representing the Turkey Farmers of Canada (TFC). He also serves on TFC's Research Committee. Mr. Meijer and his family operate two turkey farms in Alberta, R&M Poultry and Pine Valley Turkey Farm. He served on the Alberta Turkey Producers Board for seven years and was a Board Director for the Poultry Research Centre at the University of Alberta. Mr. Meijer also served on the Research Committee for the Alberta Dairy Producers, as well as a special committee assigned to improve information transfer between researchers and industry stakeholders.

Cheryl Firby is the Canadian Hatching Egg Producer (CHEP) representative and is the current chair of CHEP's Research Committee. Cheryl is the V.P of Agricultural Operations and Industry Relations for Maple Leaf Foods. She has been a director at the Ontario Broiler Hatching Egg and Chick Commission (OBHECC) since 2007 and shortly afterward became an alternate to CHEP. She continues to be a persistent advocate for improvements to the industry using science based information supporting food safety and actively supports investment into research.

Erica Charlton represents the Canadian Poultry and Egg Processors Council (CPEPC). Ms. Charlton has held the position of CPEPC Technical Director since 2006 and is responsible primarily for technical files for the poultry meat processing companies, and occasionally for the egg processor companies, as required. Ms. Charlton acts as industry/government liaison and is the processor industry's single point of contact on technical issues with CFIA and Health Canada. She is the staff lead on the Poultry Operations Technical Committee. Ms. Charlton's exposure to technical aspects of poultry meat inspection and food safety give her a unique perspective on issues relating to the CPRC.

Dr. Helen Anne Hudson represents the Egg Farmers of Canada (EFC). Dr. Hudson earned both MSc and PhD degrees in poultry science from the University of Georgia. Her education and experience provide a strong background in laying hen rearing, housing and management. Dr. Hudson is Director of Corporate Social Responsibility for Burnbrae Farms, one of the major commercial egg producers in Canada. Dr. Hudson is actively involved with a number of organizations across Canada relating to poultry research. She is past-Chair of the Advisory Board for the Alberta Poultry Research Centre, serves on the Research Committee and HACCP Committee at EFC, is past-Chair of the Poultry Industry Council (PIC) in Guelph, Ontario and is a member of the Steering Committee for the Virtual Centre for Poultry Welfare at the University of Guelph.

Timothy Keet is CPRC's Vice-Chair representing the Chicken Farmers of Canada (CFC). Tim was raised on a mixed farm in Quebec. He knew early on in life his drive was to be a chicken producer, so that set the stage focusing his education towards animal and poultry science at the Macdonald Campus of McGill University under Dr. Roger Buckland in '81. Tim farmed in Quebec until 1988 then moved to Saskatchewan with wife Catherine and 4 kids (one more on the way). Tim raised broiler breeders for 11 years then changed to roasters. Tim's brothers have all been producers and now it's the next generation building up their farm sites including son and daughter-in-law (Ryan & Tatyana). Animal behaviour and welfare has always been a key interest in Tim's life. Tim is a director for Chicken Farmers of Saskatchewan and has been involved in poultry research through that organization.

The CPRC Board of Directors meets several times per year to discuss existing and emerging issues relating to poultry research in Canada. Board meetings are also attended by staff representatives from each of the member organizations. This structure facilitates efficient communication between CPRC and its membership. Operational and financial decisions are subject to CPRC Board approval by majority vote. Whenever required, consultations are first made between CPRC and its members to ensure that CPRC activities are within its mandate and performed in the best interests of the Canadian poultry sector as a whole.

Executive Committee

CPRC's Board formed an Executive Committee (EC) in 2013 made up of the Chair, Vice-Chair and one other director (Helen Anne Hudson in 2015) to provide support and oversight for CPRC's Executive Director. The EC conducts its meetings by conference call and will have approximately ten meetings annually.

Scientific Advisory Committee

The Board is supported by a Scientific Advisory Committee (SAC) to aid in the peer review process of all research proposals submitted to the CPRC. The review process adheres to basic principles and guidelines established by the Natural Sciences and Engineering Council (NSERC) regarding potential for conflict of interest and confidentiality of information. SAC consists of six core members that serve 5-year terms. Supplemental reviewers are chosen with expertise specific to the proposals reviewed each year. Core SAC Members and Supplemental Reviewers looked at proposals received in response to CPRC's 2015 Call for Proposals.

Scientific Advisory Committee

Core members:

Dr. Hank Classen <i>University of Saskatchewan</i>	Dr. Steve Leeson <i>University of Guelph (retired)</i>
Dr. Joshua Gong <i>Agriculture and Agri-Food Canada</i>	Dr. Fred Silversides <i>Agriculture and Agri-Food Canada (retired)</i>
Dr. Doug Korver <i>University of Alberta</i>	Dr. Bogdan Slominski <i>University of Manitoba</i>

Supplemental reviewers:

Dr. Wade Abbott <i>Agriculture and Agri-Food Canada</i>	Dr. Jiewen Guan <i>Canadian Food Inspection Agency</i>
Dr. Joy Agnew <i>Prairie Agricultural Machinery Institute</i>	Dr. Quan Sophia He <i>Dalhousie University</i>
Dr. Brenda Allen <i>University of Saskatchewan</i>	Dr. Rick Holley <i>University of Manitoba</i>
Dr. Shyam Baurhoo <i>McGill University</i>	Dr. Nerine Joseph <i>N. Joseph Consulting</i>
Dr. Teresa Cereno <i>Canadian Food Inspection Agency</i>	Dr. Ron MacDonald <i>Agviro Inc</i>
Dr. Mike Czarick <i>University of Georgia</i>	Dr. Yoshinore Mine <i>University of Guelph</i>
Dr. Moussa Diarra <i>Agriculture and Agri-Food Canada</i>	Dr. Rachel Ouckama <i>Curtis Chicks Ltd</i>
Dr. Les Dickson <i>Canadian Food Inspection Agency</i>	Dr. John Prescott <i>University of Guelph</i>
Dr. Mansel Griffiths <i>University of Guelph</i>	Dr. Juan Carlos Rodriguez-Lecompte <i>University of PEI</i>
	Dr. Shayan Sharif <i>University of Guelph</i>
	Dr. Keith Warriner <i>University of Guelph</i>

Staffing

CPRC is staffed by a full-time Executive Director (ED) and Research Administrator. CPRC office support is provided through an agreement with CFC, which oversees management of CPRC's accounting system and provides office space for staff. CPRC would like to take this opportunity to thank its members for their support in maintaining staff capacity.

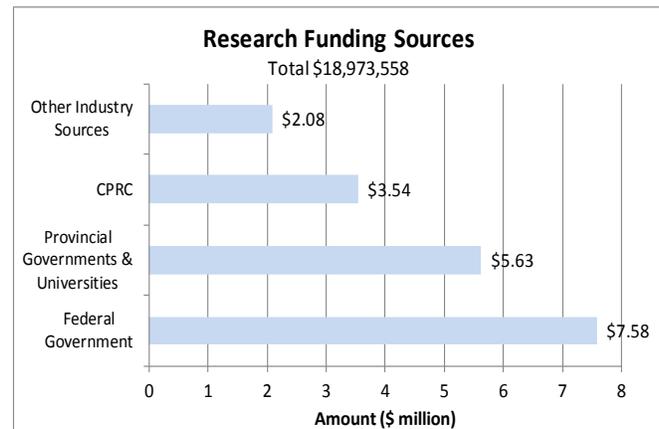
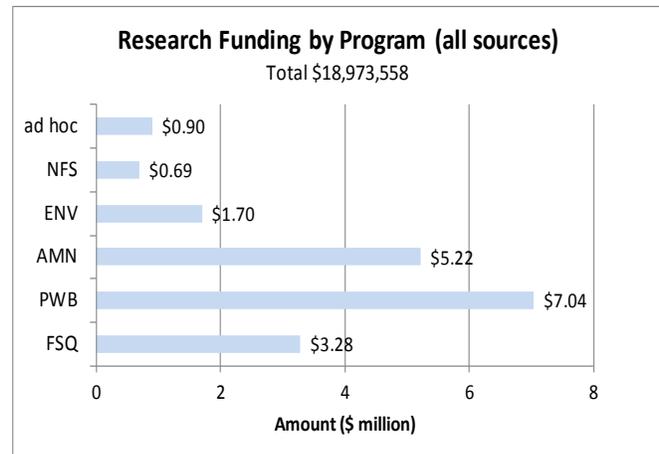
Governance

The Government of Canada revised the federal legislation governing nationally registered Not-for-Profit Corporations. CPRC was required to ensure compliance with the new act and submit transition documents to Industry Canada. The process included a by-law review, the first since CPRC's inception in 2001. By-laws were amended, with legal advice, to improve efficiency and flexibility and were approved in 2014.



Leveraging, optimizing poultry research investment in Canada

One of CPRC's main goals is to help build Canada's capacity for poultry research. To the end of 2015, CPRC Members have committed more than \$3.5 million through our regular funding programs in support of 83 research projects at universities and federal government laboratories across Canada. Although CPRC's contribution is significant, it only represents a fraction of the overall support for these projects; funds from other sources bring the total research program to almost over \$19 million. That is to say, CPRC dollars have been matched or "leveraged" at a ratio of greater than 5:1. Helping secure matching dollars is a large part of CPRC's funding process. Industry dollars (such as those from CPRC) are eligible for matching by a number of sources, such as the Natural Sciences and Engineering Research Council (NSERC) and AAFC. As a prerequisite for final approval of CPRC funding, a project must secure matching funds from these or other sources. Ten projects with research budgets totaling almost \$3 million that received conditional approval in 2014 and 2015 and are expected to meet the funding condition in 2016.



The second Poultry Science Cluster, discussed below, added more than \$5 million of research activity. The Cluster became active upon completion of agreements between AAFC and CPRC early in 2014. Cluster projects are included in the research project list in Chapter 4.

Poultry Science Cluster 2

Minister of Agriculture, Gerry Ritz, notified CPRC in October 2013 of the approval of \$4 million to support the Cluster's \$5.6 million budget with the balance of funds from industry and Ontario Ministry of Agriculture and Food. Industry is providing 26 percent of the funding for a ratio of almost 3:1. Funding supports 17 research activities involving 11 universities and 59 researchers, including international scientists.

Virtual Centre for Poultry Welfare

The Virtual Poultry Welfare Centre (PWC) was established in 2009 as part of a four-way agreement between CPRC, PIC, AAFC and the University of Guelph. A lot has been going on at the Centre ever since, both in terms of capacity building and research activities.

Dr. Tina Widowski, a professor in the Department of Animal & Poultry Science at Guelph was named the Egg Farmers of Canada Research Chair in Poultry Welfare in 2011. Dr. Widowski is involved in a number

of research programs, including a major Cluster project investigating the effects of rearing experience and housing system of parent laying hens on behaviour and stress susceptibility of their offspring, and determining if these epigenetic effects differ among commercial strains.

Dr. Alexandra Harlander-Matauschek moved to Guelph from the University of Bern, Switzerland in January 2013 to join the PWC. Dr. Harlander-Matauschek has two Cluster research projects, one of which is a study to determine if common commercial strains of layers differ in locomotory skill development and their ability to adapt to complex production environments such as aviaries. Results from this research, coupled with those from Dr. Widowski's work described above, will provide the layer industry with information to help select birds that are appropriate for the production system in which they are placed and adjust management practices that help prepare young birds for those different environments. Drs. Harlander-Matauschek, Torrey, and Widowski are also collaborating on a study looking at the impact of ammonia on the welfare of layers, broilers and turkeys, another Cluster project. CPRC's Member organizations agreed to provide annual support for the position filled by Dr. Harlander-Matauschek for six years beginning in 2013 in cooperation with PIC. Permanent funding for Dr. Harlander's position was secured under the Burnbrae Farms Professorship in Poultry Welfare in 2014.

Research Sponsorship Program

The Research Sponsorship Program was initiated in 2012 with the support of Aviagen Group, which became the inaugural sponsor. Sponsor contributions will be used along with Member Organization annual funding to help meet the increasing demand for industry research funds to match government program funding. A Research Sponsorship development plan is being designed to seek additional industry support. Details of the Research Sponsorship Program, sponsor benefits and an application can be found on our website at www.cp-rc.ca/sponsorship.php. CPRC's Board and Member Organizations thank Aviagen Group for its leadership in supporting Canadian poultry research.

Poultry Science Cluster I

In November 2010, Member of Parliament Ed Fast (Abbotsford), on behalf of Agriculture Minister Gerry Ritz, officially announced that CPRC would receive up to \$1.8 million to lead a Poultry Research Cluster. The Cluster brings together expertise from across the country to tackle some important research issues for the industry. The first Poultry Science Cluster program was concluded March 31, 2013.

Activities within the Cluster were divided into three main themes:

1. The biology and control of gut-borne bacterial diseases in poultry
2. Biology and control of avian influenza in poultry
3. Innovative production technologies and practices for Canada's poultry sector

Among the outcomes are a better understanding of certain poultry diseases, novel means of their control, and recommendations on management practices that will further improve poultry health and welfare. Summaries of preliminary results are available on the CPRC website and will be featured in a series of factsheets in the coming year.



Recognized nationally and internationally for efforts to encourage and support poultry research in Canada

Recognition of effort is of strategic importance. Potential industry, academic, and government partners are much more likely to work with CPRC if they see it as an effective, constructive organization. CPRC continues to build a positive relationship with the Science & Technology Branch of AAFC. CPRC's activities are the subject of a regular feature in Canadian Poultry Magazine, whose readership includes virtually every registered poultry producer in Canada, as well as a large proportion of industry stakeholders. CPRC will continue to reach out to funding organizations, universities, and government branches through 2014 and beyond.

Scholarship

The CPRC also directly promotes succession in our poultry research community with its scholarship program. The purpose of the program is to entice students to consider a career in poultry science. Specific program objectives are:

- To encourage and support graduate students to carry out research in an aspect of poultry science
- To build Canada's intellectual capacity in poultry science
- To promote graduate research in poultry science at Canadian universities

The CPRC offers a "Postgraduate Scholarship Supplement" of \$7,500 per year. To be eligible, a student must be studying (or planning to study) some aspect of poultry science and must hold a Natural Sciences and Engineering Research Council (NSERC) scholarship at the Masters (eligible for one year) or Doctoral level (eligible for up to two years). Details on past winners are available at the "Scholarship" section of the CPRC website, where there is also a link to the NSERC website detailing eligibility criteria and application procedures.

In order to attract students from a wider pool, CPRC also accepts applications from non-NSERC scholars. Applications to the CPRC Postgraduate Scholarship, also set at \$7,500 per year, will be assessed using the same criteria as the Supplement above, but applicants will not be required to hold a NSERC scholarship. Only one Scholarship or Supplement will be awarded each year.

The 2015 CPRC Scholarship was awarded to Sasha van der Klein, a Ph.D. student under the supervision of Dr. Martin Zuidhof, University of Alberta. Sasha completed her MSc at the University of Wageningen in 2015 in the areas of immunology, genetics and nutrition.

Sasha's research will look at broiler breeder management strategies. Her focus will be on understanding long term effects of broiler breeder rearing strategies on production and the effects on offspring performance. The focus will be on lighting and body weight management. She will also conduct research on understanding the mechanisms of transgenerational effects of nutrition. In her studies she will use the Precision Broiler Breeder Feeding System, developed by Dr. Zuidhof, which can control individual bird feed intake using real-time body weight measurements to make feed allocation decisions.



Helping to address the real poultry issues of the day

Granting procedures

Research grant procedures were changed in 2015 to simplify the process and make the timing of CPRC's review more effective for researchers. The system adopted in 2015 of receiving and reviewing research grant proposals uses a two-step process: 1) an industry review of Letter of Intent (LOI); and 2) a scientific review of methodology for a short list of LOIs identified in the first stage. In the LOI, the applicant is asked for an overview of the proposed research as well as an account of how the research will impact the poultry industry. They are asked to provide more details on research methodology than for the usual LOI to ensure sufficient information is provided for peer reviewers to express an opinion on the quality of the research plan. This system allows CPRC to work with researchers to make changes to a proposed research project subsequent to peer review so that it better addresses industry priorities.

The completed LOIs are evaluated by the CPRC Board and support staff with help from additional scientific expertise if needed and a short list of projects decided upon. Successful applications are sent for peer review (step two of the process).

The LOIs are reviewed by CPRC's Scientific Advisory Committee (SAC), the members of which represent a breadth of knowledge and expertise that can accurately assess the intricacies of the proposed methodology. Applicants then have an opportunity to address issues or concerns raised during the SAC review before a final funding decision is made by the CPRC Board.

With input from academe, government and industry, the CPRC will continually review its research priority list and, if necessary, adjust it to reflect existing and emerging issues of importance to its members. Provided they remain of high importance, the priority areas listed will be the subject of future Calls at regular intervals so as to promote continuity in existing research programs.

Proposals approved for CPRC support must secure matching funds from NSERC, AAFC or other non-industry sources before CPRC funds are released.

Research Programs

Until the 2016 call, issued in December 2015, the CPRC has supported research projects in the following program areas:

1. **Avian Gut Microbiology:** The Avian Microbiology Network (AviMicroNet) is a communication network of researchers designed to encourage the investigation of the impact of gut microflora on the nutrition, feed conversion, pathogen carriage, and health of poultry in an antimicrobial-free environment. This effort has been put forth in response to growing pressures to reduce, or possibly eliminate, antimicrobial drugs from animal feeds.
2. **Environment:** The CPRC initiated a research program dedicated to environmental issues in the poultry industry. A number of projects have been supported, which touch on a wide variety of areas. These include the prevalence and effect of veterinary pharmaceutical residues in the environment, the direct injection of poultry litter on agricultural land, the environmental implications of phosphorus and calcium flows in poultry production, workplace exposure to environmental contaminants in commercial poultry barns, useful products from spent hens, and emissions from poultry operations.

3. **Food Safety and Poultry Health:** This program covers a wide range of topics with potentially far-reaching implications for the sector. Topics include: immunization of broiler chickens against necrotic enteritis, understanding the biology of avian influenza virus and finding better ways to control it, novel multivalent vaccines for avian health, and new ways to control enteric pathogens.
4. **Poultry Welfare and Behaviour:** Research within this program covers such topics as: impact of ammonia on the welfare of laying hens, improving transport conditions for broilers, alternative methods of euthanizing turkeys, effects of lighting programs on leg weakness in broilers, improving welfare for beak trimmed hens, maintaining leg and bone structure in turkeys, implications of toe-trimming turkeys, alternative feeding strategies for broiler breeders, and the impact of daylength on turkey welfare and productivity.
5. **Novel feedstuffs:** There is an emerging need for research on the use of feedstuffs alternative to current grains, prices of which are anticipated to remain high. Research is underway relating to: potential animal health benefits of feeding distillers dried grains with solubles (DDGS), nutritive value of cold-pressed meals from various grain sources, and the economic and nutritive impact of processing alternative ingredients in turkey diets.
6. **Ad hoc:** The CPRC also funds projects that are of significance to the Canadian poultry industry, but may not fit into the broad research programs listed above. Researchers may apply for funding for this category of research at any time throughout the year according to the CPRC policy on *ad hoc* proposals. Research topics funded under the *ad hoc* program include: nutritional studies on broiler breeders, cryopreservation of avian genetic material and alternative moulting procedures in turkeys.

CPRC-supported projects

Individual projects within each of the above programs are listed below. Those marked one (¹) are part of Poultry Science Cluster 1. Those marked two (²) are part of Poultry Science Cluster 2

Avian Gut Microbiology

AMN001

Identification of gut bacteria affected by dietary antibiotics and their roles in the gut immunity of broiler chickens.

Joshua Gong, Agriculture Canada and Shayan Sharif, University of Guelph

AMN002

Molecular epidemiology of necrotic enteritis.

Patrick Boerlin, University of Guelph

AMN003

Carbohydrase enzyme supplements as growth promoters and modulators of the intestinal microflora of the chicken: The prebiotic and probiotic effect of enzyme hydrolysis products.

Bogdan Slominski, University of Manitoba

AMN004

Understanding how *Campylobacter jejuni* colonizes poultry

Brenda Allan, VIDO

AMN023

The use of cyclic-di-GMP, a novel immunotherapeutic and antibacterial molecule in chickens

Moussa Diarra, AAFC

AMN024

Investigation into cell-cell signalling in *Clostridium perfringens* infection for developing a novel disease-control strategy

Joshua Gong, AAFC

AMN025

Engineered antibodies and phage products for food safety applications

Christine Szymanski, University of Alberta

AMN027

Elucidation of critical characteristics of *Clostridium perfringens* and pathogen-host-environment interactions defining susceptibility of poultry to necrotic enteritis

Andrew Olkowski, University of Saskatchewan

AMN030

Development of live-attenuated vaccines to prevent *Campylobacter* colonization in poultry

Byeonghwa Jeon, Atlantic Veterinary College (now at University of Alberta)

AMN043

Evaluation of vacuum post pellet applications of bioactives of broiler feed on efficacy and protected delivery

Tom Scott, University of Saskatchewan

AMN045

Formulation and delivery of immunostimulatory oligodeoxynucleotides containing CpG motifs (CpG-ODN) with carbon nanotubes (CNTs) against poultry diseases

Susantha Gomis, University of Saskatchewan

AMN046

Effect of two prebiotics on gut microflora in healthy and Salmonella challenged broilers
Xin Zhao, McGill University

AMN047

Surveillance of antimicrobial resistant bacteria in antimicrobial-free and conventional broilers in Ontario – a pilot project
Michele Guerin, University of Guelph

AMN048

Stimulation of innate immune system for the control of poultry respiratory viral infections
Faizal Careem, University of Calgary

AMN053

Development of probiotic formulations with immune enhancing activities for chickens
Shayan Sharif, University of Guelph

AMN059

The impact of reducing mycotoxins in poultry feed on the natural defense against disease
Natacha Hogan, University of Saskatchewan

AMN060

Control of *Campylobacter jejuni* in chickens by vaccination
Shayan Sharif, University of Guelph

²AMN065

Evaluation of butyrate glycerides for developing an alternative to dietary antimicrobials in poultry
Joshua Gong, Agriculture and Agri-Food Canada

²AMN066

Alternative antimicrobials from chicken blood
Max Hincke, University of Ottawa

²AMN067

Development of an enzyme/yeast-based prebiotic for poultry
Bogdan Slominski, University of Manitoba

²AMN068

Non-antibiotic control of bacterial infection
Mohammed Arshud Dar, University of Saskatchewan

AMN081

Delivery of immunostimulatory oligodeoxynucleotides containing CpG motifs to broiler chickens as an alternative to antibiotics
Susantha Gomis, University of Saskatchewan

Environment

ENV006

Distribution uniformity and emission reduction potential of a precision applicator for surface and sub-surface land application of poultry manure
Claude Laguë, University of Saskatchewan (now at University of Ottawa)

ENV007

Development of a dynamic model of Ca and P flows in layers
James France, University of Guelph

ENV008

Activity-specific workplace exposures of poultry barn workers
Ambikaipakan Senthilselvan, University of Alberta

ENV009

Reducing pollution from veterinary pharmaceuticals in agricultural runoff from poultry manure
Shiv Prasher, McGill University

ENV026

Protein-based biomaterials from spent hens
Jianping Wu, University of Alberta

ENV029

Assessment of concentrations and emissions of airborne pollutants at various poultry operations
Bill Van Heyst, University of Guelph

ENV049

Evaluation of phosphorus utilization by broilers using different approaches
James France, University of Guelph

ENV056

Biopolymer-based nanocomposites from poultry industry byproducts for packaging applications
Aman Ullah, University of Alberta

²ENV074

Evaluation of control strategies to reduce emissions of particulate matter and ammonia from poultry operations
Bill Van Heyst, University of Guelph

²ENV076

Determining the genetic relationships between feed efficiency, production traits and greenhouse gas (NH₃, N₂O, CO₂, and CH₄) emissions in turkeys.
Ben Wood, Hybrid Turkeys (Hendrix Genetics)/University of Guelph

²ENV077

Validation of a new LED light bulb designed for the egg-laying industry
Grégoy Bédécarrats, University of Guelph

ENV082

Optimize and scale-up preparation of spent hen adhesive
Jianping Wu, University of Alberta

Food Safety & Poultry Health

FSQ011

Immunization of broiler chickens against necrotic enteritis
John Prescott, University of Guelph

FSQ012

Immunology of T cell-mediated immune response to avian influenza virus in the chicken
Shayan Sharif, University of Guelph

FSQ014

Development of second generation RNA interference constructs against avian influenza virus
Sergei Golovan, University of Guelph (now at Spartan Bioscience)

FSQ015

Novel multivalent vaccines for avian health
Éva Nagy, University of Guelph

¹FSQ032

The pathogenesis and control of necrotic enteritis in broiler chickens
John Prescott, University of Guelph

¹FSQ033

Development of *Salmonella* Enteritidis vaccine for layers and breeding hens
Martine Boulianne, University of Montreal

¹FSQ034

Use of encapsulated essential oils for controlling enteric bacterial pathogens in chickens
Joshua Gong, Agriculture and Agri-Food Canada

¹FSQ035

Determining the molecular basis of adaptation of influenza viruses from their natural reservoir to domestic poultry
Yohannes Berhane, Canadian Food Inspection Agency

¹FSQ036

Study of transmission of avian influenza virus (AIV)
Jiewen Guan, Canadian Food Inspection Agency

¹FSQ037

Immune response to avian influenza virus (AIV)
Shayan Sharif, University of Guelph

¹FSQ038

Developing novel vaccines against AIV and exploring efficient delivery systems for these vaccines
Eva Nagy, University of Guelph
Suresh Tikoo, VIDO
Dele Ogunremi, Canadian Food Inspection Agency

⁴FSQ061

Understanding and controlling necrotic enteritis in broiler chickens
John Prescott, University of Guelph

²FSQ062

Assessment of *Clostridium perfringens* pili in vaccine development for controlling necrotic enteritis in chickens
Joshua Gong, Agriculture and Agri-Food Canada

²FSQ063

Development of novel and rational vaccine formulations against avian influenza virus infection in chickens
Shayan Sharif, University of Guelph

²FSQ064

Assessment and mitigation of contamination risks: critical knowledge to reduce diseases and increase biosecurity compliance
Jean-Pierre Vaillancourt, University of Montreal

FSQ083

A novel necrotic enteritis vaccine strategy: type IV pilus of *Clostridium perfringens*
Martine Boulianne, University of Montreal

Poultry Welfare & Behaviour

PWB017

Engineering, animal welfare and meat quality considerations of broiler transportation in a heated and ventilated vehicle
Trever Crowe, University of Saskatchewan

PWB018

Improving welfare for beak trimmed hens through reducing variability and technology transfer
Hank Classen, University of Saskatchewan

- PWB019
Effect of lighting programs on leg weakness and bird welfare in modern commercial broilers
Hank Classen, University of Saskatchewan
- PWB020
Evaluation of alternative methods of euthanasia for cull turkeys
Tina Widowski, University of Guelph
- PWB021
Impact of ammonia on welfare of laying hens, and implications for the environment
Steve Leeson, University of Guelph
- ¹PWB039
Maintaining leg and bone structure in commercial poultry
Doug Korver, University of Alberta
- ¹PWB040
Assessing the behaviour and welfare of broiler breeders using alternative feeding strategies
Stephanie Torrey, Agriculture and Agri-Food Canada
- ¹PWB041
Implications of toe clipping on the welfare of commercial turkeys
Hank Classen, University of Saskatchewan
- PWB050
Investigating methods of assessing bird wetness as a means to determine fitness for transport
Trever Crowe, University of Saskatchewan
- PWB051
Daylength and its impact on turkey welfare and productivity
Hank Classen, University of Saskatchewan
- PWB052
Identification of risk factors during broiler transportation that influence injury and mortality
Michael Cockram, University of Prince Edward Island
- PWB054
Is feather pecking in turkeys related to genetics and activity levels?
Ben Wood, University of Guelph/Hybrid Turkeys
- ²PWB069
Epigenetic transfer of behaviour and stress susceptibility in the laying hen: Influence of rearing and housing of different strains of parent stock on offspring phenotype
Tina Widowski, University of Guelph
- ²PWB070
Development of flight and locomotion in laying hens
Alexandra Harlander-Matauschek, University of Guelph
- ²PWB071
Improving foot pad quality in commercial broilers: benchmarking and practical strategies
Clover Bench, University of Alberta
- ²PWB072
Study of the impact of various stocking densities on the performance, health and welfare of turkey broilers and heavy turkeys
Karen Schween-Lardner, University of Saskatchewan

²PWB073

The influence of extreme temperature on turkey physiology, welfare, and meat quality
Trever Crowe, University of Saskatchewan

²PWB075

Impact of ammonia on the welfare of poultry
Alexandra Harlander-Matauschek, University of Guelph

PWB078

Optimizing Lighting for Precision Broiler Breeder Feeding
Martin Zuidhof, University of Alberta and Grégoy Bédécarrats, University of Guelph

PWB079

Assessing methods for on-farm euthanasia of turkeys, chickens, breeders, and layers
Tina Widowski, University of Guelph

PWB080

Alternative feeding strategies for broiler breeders
Tina Widowski, University of Guelph

PWB084

Does infrared beak treatment impact young pullets – behaviour, water consumption, and ability to peck?
Karen Schwean-Lardner, University of Saskatchewan

Novel Feedstuffs

NFS028

Distillers dried grains with solubles (DDGS) as a potential source of immunostimulatory and growth promoting activity for poultry
Bogdan Slominski, University of Manitoba

NFS042

Nutritive evaluation of cold-pressed meals for broiler chickens
Derek Anderson, Nova Scotia Agricultural College

NFS044

The economic advantages of processing on feed value of alternative ingredients for turkeys
Tom Scott, University of Saskatchewan

Ad hoc

UAB005

The impact of timing of protein intake and growth patterns on reproductive efficiency in broiler breeder females.
Frank Robinson, University of Alberta

AGA010

Cryopreservation of Canada's remaining avian germplasm
Fred Silversides, Agriculture and Agri-Food Canada

CTM022

Use of dietary thyroxine as an alternative molting procedure in turkey breeder hens
Grégoy Bédécarrats, University of Guelph

AGA031

Cryogenic storage and efficient recovery of avian genetic material
Fred Silversides, Agriculture and Agri-Food Canada

UAB055

Effect of incubator temperature and breeder flock age in two broiler strains on embryonic overheating
Doug Korver, University of Alberta

UAB057

Establishing a production system for long-chain w-3 PUFA Enrichment of table eggs using a novel high-stearidonic acid flax
Doug Korver, University of Alberta

New research in 2015

Avian Gut Microbiology

AMN081

Susantha Gomis, University of Saskatchewan

The emergence and rising spread of resistant bacteria are rendering current antibiotics less useful. Thus, there is pressure to restrict the use of antibiotics in agriculture, while at the same time antibiotics are becoming less effective in treating infections. The goal of this research is to evaluate and develop an environment controlled CpG-ODN delivery aerosol chamber to reduce the use of antimicrobials while maintaining or improving the health, productivity and welfare of chickens.

Environment

ENV082

Jianping Wu, University of Alberta

Petroleum-based adhesives dominate the market due to their affordable cost and satisfactory performance. However, concerns over emission of volatile organic compounds and limited reserves of petroleum have regained the interest of developing bio-based adhesives from renewable resources. Historical adhesives were prepared from casein, animal blood, and gelatin; however adhesives prepared from proteins are reported to have low bonding strength and poor water resistance. Research advancement has made significant progress in improving the adhesive properties of protein-based adhesives. The goal of this project is to optimize adhesive preparation from spent hen carcass, improve spent hen adhesive property by formulation of various additives, scale-up process spent hen adhesive and test the applicability of adhesives in furniture and building products.

Food Safety and Poultry Health

FSQ083

Martine Boulianne, University of Montreal

There is increased pressure from consumers, restaurants and government authorities to produce antibiotic free (ABF) chicken. This is a challenge for the Canadian poultry industry as chickens raised with no antibiotics and no anticoccidials are more at risk to develop necrotic enteritis (NE). No molecular epidemiological study has compared the organization of genes encoding the type IV pilus in both commensal and virulent *C. perfringens* strains, nor the role of these genes in the colonization of broilers and in the appearance of necrotic enteritis. Therefore the objective of this study is to evaluate the role of attachment mediated by type IV pilus in the virulence of *C. perfringens* to ultimately develop a new vaccine strategy.

Poultry Welfare and Behaviour

PWB079

Tina Widowski, University of Guelph

The recent development of a non-penetrating captive bolt (NPCB) device, the Zephyr-E, has been validated for use on turkeys and is an option for on-farm euthanasia. This device has led to the development of other NPCB devices, however the need remains to scientifically validate the efficacy of these devices for inducing rapid loss of consciousness and death in poultry on farm. The objectives of this study are to validate the efficacies of two NPCB devices (TED and Zephyr-EXL) and two commercially available mechanical cervical dislocating devices for inducing rapid loss of consciousness and death in poultry.

PWB084

Karen Schwean-Lardner, University of Saskatchewan

Beak treatment remains one of the most effective means to controlling cannibalism within the poultry industry. However, despite evidence that infrared beak (IR) treatment is less detrimental to the welfare of egg production birds than other traditional forms of beak trimming, societal concerns still exist for any form of beak manipulation. It is vital that we understand the impact that management practices have on birds. This study will address the issues of IR treatment to provide valuable and detailed information on the impact that the treatment does or does not have on the behaviour of egg production pullets, and may lead to improvements in management practices involved in the rearing of these pullets to improve welfare and productivity of the birds.



Transferring knowledge to the users of poultry research

Updates

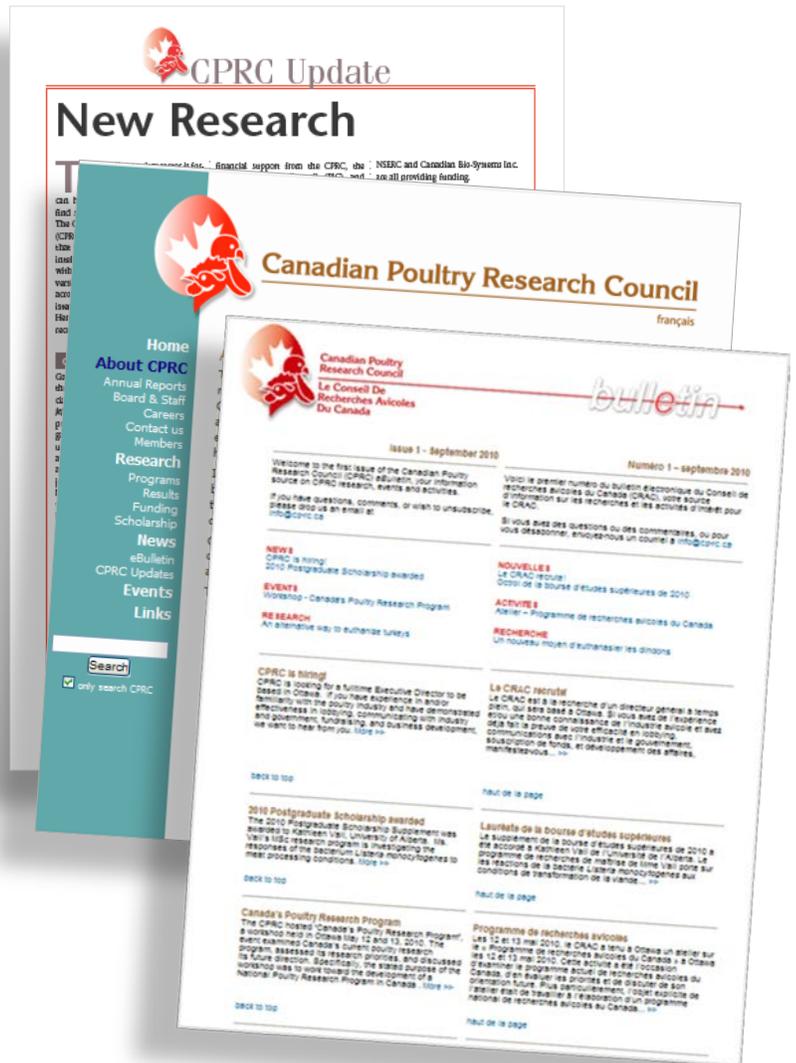
CPRC prints a monthly feature in Canadian Poultry magazine. The articles provide updates on recent CPRC activities and often include summaries of completed research projects. The summaries are written in simple language and explain how the projects fit into overall research programs, and how the research relates to the farm. Research results are also provided to the CPRC member organizations who then relay the information directly to their respective members. Results are, of course, published in peer-reviewed scientific journals and shared worldwide throughout the scientific community.

Website

The CPRC website provides comprehensive information on CPRC and Canadian poultry research. Status reports are provided for all CPRC-supported research, as well as news, updates and events. The “Links” section provides a quick stop to find a variety of sites relating to poultry research.

eBulletin

An electronic bulletin is periodically emailed to stakeholders across the country as a quick update on research results and CPRC activities.



Appendix – Acronyms used

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AAFC	Agriculture and Agri-Food Canada
AIP	AgrInnovation Program
AviMicroNet	Avian Gut Microbiology Network
CFC	Chicken Farmers of Canada
CHEP	Canadian Hatching Egg Producers
CPEPC	Canadian Poultry and Egg Processors Council
CPRC	Canadian Poultry Research Council
EFC	Egg Farmers of Canada
LOI	Letter of Intent
NSERC	Natural Sciences and Engineering Council
PIC	Poultry Industry Council
PWC	Poultry Welfare Centre
SAC	Scientific Advisory Committee
TFC	Turkey Farmers of Canada