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**POULTRY CRC**

**Call for Preliminary Research Proposals 2013**

## Preliminary Research Proposals (PRPs) are due by 5pm EDST on Friday 1 November 2013.

Submission by **email only** to admin@poultrycrc.com.au

*Background*

The Poultry CRC is **not** a funding body. This process is designed to encourage researchers from our partner organisations to put forward research ideas that encompass frontier science, industry relevance and genuine collaboration. Indeed, every proposal received will be evaluated for its science, utility and fit-for-purpose in the Poultry CRC environment.

The Poultry CRC has three **Programs**, which cover nine **Projects**. Each **Project** has specific **Outputs** associated with that Project. Our objective is to produce these **Outputs** by meeting the milestones listed under each **Output**. Please see the Attachment for a detailed outline of the CRC’s Programs.

***Requirements for Proposals***

**KEY AREAS TO CONSIDER**

For this round:

* Vaccines for poultry diseases of industry importance
* Parental nutrition for progeny health and performance
* Links between nutrition and environmental impact
* Holistic approaches to free range production
* Net energy systems for layers and broiler breeders

*Proposals addressing the above milestones will be given priority. Proposals broadly aligned with other outstanding milestones in our programs (see Attachment), may be given consideration after proposals on the above milestones are considered.*

**START DATE**

Please indicate anticipated start and end date of the sub-project. The start date should be after 1 July 2014.

**ELIGIBILITY FOR CRC FUNDS**

Poultry CRC funding is open to all researchers employed by or affiliated with its Participants. Researchers from non-participant organisations are not eligible to submit Proposals in their own right, but are welcome to collaborate with researchers from Participants (please see the list of current CRC Participants at poultrycrc.com.au). Funding under such an arrangement will be through a subcontract with the organisation employing the Sub-Project Leader.

**PROPOSAL SUPPORT**

The Poultry CRC funds are to be used for the essential work required for the project. Salaries of existing employees of Participants will not be funded, but salaries and salary related on-costs for early-career scientists will be considered on a case by case basis. Large Capital items (see Infrastructure and Overheads below) exceeding $20,000 in value will not be allowed and Travel is considered separately.

**ORGANISATION’S IN-KIND CONTRIBUTION**

In-kind contributions to the Proposal must be identified as Full-Time Equivalents (FTEs) according to the Federal Government’s nominal values for Round 11 for in-kind staff (covering salary, on-costs and overheads) as follows (per FTE):

Program Leader / Senior Manager $380,000

Project / Theme Leader / Key Researcher / Manager $260,000

Researcher / Professional $200,000

Other (support staff – technical, administrative, etc.) $160,000

In-kind contribution of CRC-funded staff must be calculated by subtracting the CRC cash grant from the corresponding nominal values listed above. For example, if the CRC is funding a technician’s salary and salary on-costs at your organisation with a total cash grant of $60,000 per annum, then your organisation’s CRC-funded staff in-kind contribution is: $160,000-$60,000=$100,000 per annum.

**INFRASTRUCTURE AND OVERHEADS**

If you are an Australian University, the Poultry CRC will grant up to an extra 20% to compensate for indirect research costs (infrastructure overhead charge). However, the Poultry CRC discourages the use of CRC funds to support large capital items or infrastructure.

**TRAVEL**

Applicants should not include travel costs in their Research Proposals unless essential to the day to day conduct of the Proposal. Applications for international and domestic travel will be considered by the CRC at the time.

**POSTGRADUATE STUDENTS**

Scholarships for postgraduate and honours students are considered separately by the CRC and should not be included in the proposed budget. However, you are encouraged to discuss with the CRC (please contact Ms Liz Roan, Education Manager) if you have a good student in mind.

**PREPARING YOUR PROPOSAL**

The Poultry CRC uses a two-stage process, involving submission of a PRP and then, only *following an invitation from the Poultry CRC,* submission of a more detailed Full Research Proposal (FRP). FRPs are expected to be called in December and to close in mid-February 2014.

To avoid research duplication, we will make your Proposal(s) available to the Rural Industries R&D Corporation and the Australian Egg Corporation Limited. In submitting a Proposal to the CRC, you agree to us forwarding it to these funding bodies.

Public sector researchers are advised to submit their Proposals via their Research Administration offices. The Poultry CRC does not require signed copies for Preliminary Research Proposals.

**FURTHER INFORMATION**

Applicants are advised to contact the relevant Program Managers to discuss their applications.

Dr John Lowenthal (**Program 1**): Ph: 03 5227 5759 Email: john.lowenthal@csiro.au

Dr Tim Walker (**Program 2**): Ph: 02 8668 4585 Email: twalker@poultrycrc.com.au

Dr Pat Blackall (**Program 3**): Ph: 07 3362 9498 Email: pblackall@poultrycrc.com.au

**Poultry CRC**

Preliminary Research Proposal Form

Please delete all Drafting notes, including this in the form. A PRP application must not exceed 3 pages in total.

|  |
| --- |
| Sub-Project Title (10 words maximum): |
| Poultry CRC Program/Project:  |
| SUB-PROJECT LEADER’S CONTACT DETAILS: |
| Title: | First Name: | Surname: |
| Mailing Address: |
| Phone Number: | Email: |
|  |
| **CRC OUTPUTS THIS SUB-PROJECT ADDRESSES** |
| Drafting note: Clearly outline which Outputs and associated milestones this Sub-project addresses.  |
| **SCIENCE AND INNOVATION**  |
| Drafting note: What is new in the Sub-project and why is it new? |
| **COMMERCIAL OR UTILISATION PLAN** |
| Drafting note: Outline the commercial or utilisation plan. Please identify the end-users you will engage in, provide a clear time frame for delivery, and describe the challenges for adoption. |
| **RESEARCH DESIGN AND METHODOLOGY** |
| Drafting note: Briefly describe the Sub-project design and key scientific methods to be used. |
| **RESEARCH TEAM AND FACILITIES** |
| Drafting note:Please briefly describe your research team; highlight the facilities essential for the conduct of the research, and outline the collaborative linkages both within and outside the Poultry CRC network. |

Start date: End date:

Preliminary Budget (Exclusive of GST):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2014/15 | 2015/16 | 2016/17 | **TOTAL** |
| Salaries |  |  |  |  |
|  Technicians etc |  |  |  |  |
| Salary on-costs |  |  |  |  |
| Operating |  |  |  |  |
| **Total requested from CRC** |  |  |  |  |
| In Kind FTE |  |  |  |  |
| CRC funded FTE |  |  |  |  |
| Indirect costs up to 20% of grant\* |  |  |  |  |

\* The Poultry CRC will cover "In-direct overhead costs" of research conducted at Australian universities only.**Attachment**

***Research Programs***

**Key Objectives**

Three integrated Programs will address the major challenge of meeting increasing demand for ‘clean and green’ poultry products and maintaining food security in the face of climate change and population growth. This will require innovative approaches to: (a) maintaining poultry health and enhancing bird welfare; (b) improving resource utilisation and reducing environmental impacts of poultry production; and (c) controlling poultry product-associated food safety issues and enhancing egg quality for consumers.

**Program 1 - Health and Welfare**

**Aims:** To maintain a sustainable, healthy and welfare conscious supply of poultry products despite newly emerging pathogens, increasing environmental concerns about production and changing consumer demands. For many diseases, current vaccines fail to offer complete protection. Changes in production, including reduced reliance on antibiotics and increased use of free-range systems, require a complete reconsideration of protection strategies. The CRC will bring together the world’s best research and capability providers in diagnostics, animal health products and welfare to develop a holistic solution. This program of highly integrated projects will build on the success of the current CRC while adding key capabilities, such as vaccine delivery methods, mass sequencing of antigens, and therapeutics.

**Project 1.1 - Next generation vaccines to improve health and welfare of poultry** will develop novel vaccines against the most significant parasitic, viral and bacterial pathogens afflicting the poultry industry. This will extend from the development of novel attenuated strains of infectious agents for use as live vaccines, to the identification of key protective antigens that can be delivered via new technologies and novel adjuvants (Projects 1.3 and 1.4).

**Project 1.2 - Development and delivery of rapid and specific diagnostic tools** will fine-tune and improve the suite of tests developed in the current CRC, and develop a new panel of essential diagnostic tools for the rapid detection of viral, parasitic and bacterial pathogens. This will enable industry to determine the effectiveness of control strategies, leading to faster responses to disease incursions.

**Project 1.3 - Novel therapeutics** will develop new therapeutic agents to improve poultry health and welfare by manipulating the immune response and identifying novel targets for anti-microbial and anti-parasitic drugs. Innovative technologies such as RNA interference (RNAi) in gene expression and immuno-modulators have the potential to be developed as novel therapeutics and vaccine adjuvants. For example, RNAi can be used to modify production traits, such as sex determination, while cytokines can be used as new forms of anti-viral agents or as vaccine adjuvants. This work is largely a consolidation of previous activities that further builds our existing intellectual property portfolio and will give the poultry industry access to advanced technology.

**Project 1.4 - Delivery systems for bioactives** will address the key industry challenge of safe and effective mass delivery of vaccines and therapeutics. Two linked research strategies will focus on developing novel health products that can be delivered either by *in ovo* administration or via the use of live vectors, two of the commonly available delivery mechanisms.

**Project 1.5 - Scientific approaches for assessing and reducing risks to welfare** will help the Australian poultry industry achieve more sustainable production by maintaining optimal welfare outcomes. This will require research, development and extension in: welfare methodology; welfare assessment; housing and husbandry; and education.

**Outputs:** Listed milestones

* 1. ***Vaccines for control of significant diseases are developed and commercialised***
* Vaccines at an advanced stage of development in CRC 1 registered and marketed (Yr2)
* Genes encoding novel targets for attenuation or protective antigens identified (Yr3)
* Proof-of-concept studies completed for identification of candidate vaccines (Yr4)
* Commercially viable vaccine candidates have passed safety and efficacy requirements for pre-registration (Yr6)
* Commercial use commenced for some novel products (Yr8)

***1.2 Tests available to industry through a range of diagnostic services***

* Improve and fine-tune tests developed in Poultry CRC 1 (Yr1)
* Genes encoding diagnostic antigens, or suitable for use as nucleic acid-based, novel diagnostic tests, identified (Yr2)
* Novel tests developed and their sensitivity and specificity confirmed (Yr4)
* Standardised new tests made available to industry (Yr5)

***1.3*** ***Methods for sex determination in poultry via* in ovo *delivery of RNAi molecules***

* RNAi techniques improved and tested (Yr1)
* *In ovo* delivery methods developed (Yr2)
* Testing commenced in birds (Yr5)
* Strategies in place for commercial delivery of technology (Yr6)

***1.4 New vaccine vectors, immuno-enhancers and adjuvants for* in ovo *delivery***

* Test products developed in Poultry CRC 1 in *in ovo* delivery system (Yr1)
* Bacterial and viral vector constructs tested for delivery of NetB vaccine (Yr2)
* Three new adjuvants identified and proof-of-concept studies completed (Yr3)
* New enhancers and adjuvants developed and registration trials of candidate commercial products commenced (Yr4)
* Test enhancers and adjuvants *in ovo* or in vectors (Yr5)
* Registration trials of candidate commercial products completed (Yr7)

***1.5 New anti-viral and anti-parasitic therapeutics and anti-inflammatory agents***

* Identification of candidate RNAi, miRNA, aptamer and cytokine molecules (Yr1)
* Proof-of-concept in *in vitro* assays (Yr2)
* Proof-of-concept in animal models and registration trials of candidate commercial products commenced (Yr3)
* Registration trials of candidate commercial products completed (Yr6)

***1.6 New evidence-based welfare methods developed***

* Welfare assessment under different housing and husbandry practices developed (Yr3)
* New surveys and training programs adopted by industry (Yr4)
* New tools and strategies used to benchmark welfare standards (Yr5)

**Education and Training outputs**:

**1.7** At *least six Honours students, 15 postgraduates (PhDs or Masters) and three internships completed*

***1.8*** *At least 50 scientific publications and eight patent applications lodged*

***1.9*** *At least 20 graduates trained via an online program in avian disease diagnosis*

***1.10*** *Teachers'* resources in poultry health and disease and poultry welfare

**Program 2 – Nutrition and Environment**

**Aims:** To address resource utilisation and reduction of environmental impacts, including the emission of odours and greenhouse gases (GHG).

**Project 2.1 - Improving production efficiency through nutrition** applies radical thinking to help meet rising demand for poultry products with increased efficiency and reduced environmental footprint. Feed represents approximately 60% of the cost of poultry production, so it is imperative that industry has the means to maximise retention of essential nutrients and minimise losses through excretion. This project focuses on: (a) gut health in relation to nutrient supply, and nutrient retention and partitioning; and (b) a net energy feed formulation system using Australian feed ingredients to formulate diets that meet nutrient and energy requirements of poultry in the most efficient way.

**Project 2.2 - Environmental footprint of production** will help industry reduce its environmental impact, which is essential for the sustainability and profitability of poultry production. This will be achieved by reducing odour and GHG, and adding value to waste streams. The project will extend the significant progress made during CRC 1 to quantify dust and odour emissions from poultry production. Research will focus on the development of tools to readily monitor and control environmental impacts. Poultry litter is a nutrient source with potential to deliver agricultural and environmental benefits well beyond those provided by conventional inorganic fertilisers (which do not permit on-demand use of nutrients by plants). Outcomes will include using spent litter to make biofuel and soil conditioners, and developing odour mitigation technology to improve amenity for peri-urban dwellers. Carbon captured in spent litter also presents a potential carbon offset for industry.

**Outputs:** Listed milestones

**2.1 A set of nutritional tools used by producers to maintain good gut health in poultry**

* Fine-tune and improve the molecular tools developed in Poultry CRC 1 (Yr1)
* Phylogenetic descriptions of healthy gut and litter microbial communities (Yr3)
* Novel gut modulators tested and proven under Australian conditions (Yr4)

**2.2 New feed formulations based on net energy of common Australian feed ingredients**

* Best correlations between specific nutrients and energy metabolism identified (Yr1)
* Test diets based on metabolisable energy and net energy values formulated (Yr2)
* Net energy values for commonly used feed ingredients established (Yr4)
* Validation of effectiveness of diet formulations based on net energy (Yr5)
* Net energy database for producers established (Yr6)
* Net energy systems for feed formulations in at least 50% of industry implemented (Yr7)

**2.3 Commercialisation of** ***odour and greenhouse gas (GHG) sensing systems and mitigation processes***

* Technologies for odour and GHG sensing tested in commercial facilities (Yr2)
* Technologies for reducing emissions in development (Yr6)
* Validation of on-farm mitigation strategies for odour and GHG underway (Yr7)

***2.4 Recommendations to producers based on assessment of the full lifecycle of options for improving carbon retention and nutrient use efficiency in soils***

* Evaluation of management techniques to promote carbon retention in soils (Yr2)
* Techniques for identifying microbial gas producers developed (Yr4)
* Carbon retention strategies recommended to producers (Yr5)

***2.5 Establishment of value-adding strategies for wastes***

* Recommendations developed for waste stream mitigation / value-adding (Yr4)
* Mitigation strategies introduced to commercial production facilities (Yr8)

**Education and Training outputs**:

**2.6** At least five Honours students, 10 postgraduates (PhD or Masters) and two internships completed

**2.7** At least 15 scientific publications

**2.8** At least 10 industry personnel trained via a formal Vocational Education and Training (VET) system in nutrition and environmental management systems

**2.9** Teachers’ resources in poultry nutrition and environmental management

**2.10** At least 10 staff and students completed exchange visits for education, training and work experience in Australian SMEs and overseas institutions

**Program 3 – Safe and Quality Food Production**

**Aims:**  To control food-borne illnesses related to poultry products (*i.e.*, *Campylobacter* for chicken meat and *Salmonella* for eggs) and addresses major consumer dissatisfaction associated with inconsistency in egg quality.

**Project 3.1 - Novel on-farm approaches for control of *Campylobacter* in meat chickens** willattack the biggest food safety issue facing the global chicken meat industry*. Campylobacter* is the world’s most significant cause of bacterial food-borne illness, with poultry meat consistently identified as a source of the organism. Extensive efforts to prevent or control *Campylobacter* infections in chickens have not achieved significant progress and there is currently no effective prevention or control program. The CRC will employ interlinked sub-projects to develop a multi-pronged approach to control *Campylobacter*. The sub-projects will include the development of rapid detection tests (see Project 1.2), vaccines, novel feed compounds with anti-*Campylobacter* activity, and modulation of gut microflora. Previous unsuccessful attempts by other researchers employed single approaches in isolation; whereas the CRC’s collaborative research strategy will combine all approaches developed in the sub-projects to reduce *Campylobacter* numbers at crucial points along the chicken meat production chain.

**Project 3.2 - A multi-pronged approach to improving egg quality and safety** will focus on the egg industry’s major problem of ensuring consistent production of high quality eggs. This project will investigate: the genetic basis of albumen quality; biochemical changes in albumen glycoproteins associated with reduced egg quality; the control of egg related food safety issues, such as *Salmonella*; and the production of novel products from eggs and egg shell wastes.

**Outputs:** Listed milestones

***3.1 Development of a rapid detection method for* Campylobacter *in poultry***

* Various approaches for detecting *Campylobacter* investigated (Yr1)
* Two best methods tested (Yr2)
* Best method validated (Yr3)

***3.2 Management options allow industry to adopt targeted, operation specific food safety programs to reduce* Campylobacter *levels in meat chickens***

* Identification and laboratory testing of protective antigens, novel compounds and microflora (Yr2)
* Small scale pen trials to evaluate *in vivo* efficacy of identified antigens completed (Yr3)
* Protective tools effective *in vivo* evaluated in field trials (Yr5)
* Further field trials evaluating combinations of tools completed (Yr6)

***3.3 Significant improvement to egg quality and safety***

* Changes in glycoproteins associated with albumen quality identified (Yr1)
* Incidence of translucency and microcracks in eggs and ability of bacteria to enter the egg determined (Yr4)
* Intelligent sensors of egg freshness tested in commercial facilities (Yr6)
* Protective tools developed in Output 3.2 tested for *Salmonella* (Yr7)
* Solutions to incidence of translucency and microcracks in eggs implemented (Yr8)

***3.4 Development of new products from eggs and egg industry wastes***

* Potential ways to use egg and egg shell wastes reviewed (Yr1)
* Initial proof-of-concept work conducted (Yr3)
* Prototype products from egg and egg shell wastes tested (Yr6)
* Commercial potential of new products evaluated (Yr7)

**Education and Training outputs**:

**3.5** At least five Honours students, 10 postgraduates (PhD or Masters) and two internships completed

**3.6** At least 15 scientific publications

**3.7** Forty industry personnel trained via a VET system in on-farm food safety (20) and assessment of egg quality and safety (20)

**3.8** Teachers’ resources on food safety and egg quality