Australian Government
Fisheries Research and Development Corporation

Health Highlights

Aquatic Animal Health Subprogram Newsletter
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In this issue

From the Subprogram Leader

2013 FRDC Australasian Scientific Conference on Aquatic Animal Health

Following on from the 2011 FRDC Australasian Scientific Conference on Aquatic Animal Health that was held in Cairns at The Pullman Reef Hotel, it has been decided to return to this venue for the 2013 conference. **The dates for the 2013 conference are 8-12 July 2013**. The format of the 2013 conference will be similar to previous Cairns conferences:

Date	Time	Activity
Mon 8 Jul	6-8 pm	Registration/welcome
Tue 9 Jul	8-8.45 am	Registration
Tue 9 Jul	9 am-5 pm	Scientific program
Tue 9 Jul	6-7 pm	Happy hour
Wed 10 Jul	9 am-5 pm	Scientific program
Wed 10 Jul	6-7 pm	Happy hour
Thu 11 Jul	9 am-5 pm	Scientific program
Thu 11 Jul	6-7 pm	Happy hour
Fri 12 Jul	9 am-5 pm	Scientific program
Fri 12 Jul	7-11 pm	Conference dinner

You will note that the scientific program will be held over 4 days to accommodate the increasing interest in the conference both domestically and from overseas, and in an attempt not to make the days overly long. In response to the feedback we received, there will be a short happy hour at the end of each day to facilitate networking opportunities, and the conference dinner will be held on the last day of the conference.

I am pleased to announce that two international experts have accepted invitations to be keynote presenters at the conference:

Prof Hugh Ferguson, Head of the Department of Pathobiology, Director of the Marine Medicine programme, Professor of Pathology, School of Veterinary Medicine, St George's University,

The Pullman Reef Hotel, Cairns – Venue for the 2013 Australasian Scientific Conference on Aquatic Animal Health, 8-12 July 2013

Grenada, West Indies will present on gill diseases of fish and on emerging diseases of farmed fish.

Prof Don Lightner, Aquaculture Pathology Laboratory, Department of Veterinary Science and Microbiology, University of Arizona, OIE Reference Laboratory for Crustacean Diseases will present on crustacean diseases.

We are extremely fortunate to obtain the services of Hugh and Don for the conference. They are both internationally renowned aquatic animal health experts in their respective fields and their presentations will be exceptional. So, I recommend that you put the conference dates in your diary and watch for the conference announcement and registration package which will be released shortly.

STC/SAC Meetings

The FRDC AAHS met on 18/19 July 2012 to review submitted Expressions of Interest (EoIs) for the 2013-14 funding cycle. Feedback was forwarded to PIs. Finalised EoIs are due by 1 September 2012. Please do not be late to avoid disappointment. The finalised EoIs will be reviewed in October and recommendations forwarded to the FRDC Board.

Health Subprogram Website

Our website is located of the FRDC site and can be accessed directly under:

http://www.frdc.com.au/research/aquatic_animal_health/Pages/default.aspx

There you can view this issue and all previous issues of *Health Highlights* - in addition to finding other information about the FRDC Aquatic Animal Health Subprogram. For Final Reports see

http://www.frdc.com.au/research/final-reports/Pages/default.aspx.

Please contact FRDC if you have problems with this website.

Announcements

All final reports are available through the FRDC. Go to www.frdc.com.au to purchase a copy.

Newsletter submissions

The Aquatic Animal Health Subprogram welcomes contributions to *Health Highlights* on all aquatic animal health R&D news and events – both within and outside the FRDC. We aim to assist the widespread exchange of information by including any of the following in each bi-annual edition: project updates, milestone reports, final reports, research papers, project communication and extension outputs, info sheets, and letters to the editor. Announcements of conferences, workshops, meetings, etc are also welcome.

Please forward contributions for the next edition of *Health Highlights* (December 2012) to Joanne Slater before 15 November 2012.

Mailing list

Health Highlights is distributed biannually to stakeholders via hard copy and email as well as being posted on the FRDC website at: http://www.frdc.com.au. To change contact details or to ensure inclusion on the *Health Highlights* mailing list, contact Joanne at:

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2013 FRDC Australasian Scientific Conference on Aquatic Animal Health

The 2013 Biennial FRDC Australasian Scientific Conference on Aquatic Animal Health will be held on 8-12 July 2012, in Cairns at The Pullman Reef Hotel (http://www.pullmanhotels.com/gb/hotel-2901-pullman-reef-hotel-casino/index.shtml). Further details including registration, abstract submission etc. will be announced in the near future.

Perkinsus Research

Enhanced molecular diagnostic tests for *Perkinsus* – a parasite found in wild abalone – will be developed by the AAHL Fish Diseases Laboratory and State Government departments to improve the management and production of Australia's abalone industry.

Perkinsus is a protozoan parasite and the cause of serious disease and on-going losses in commercial mollusc populations in temperate waters worldwide. Two species, *P. marinus* and *P. olseni*, are currently listed internationally by the World Organisation for Animal Health as the cause of notifiable disease in aquatic animals.

According to Nick Gudkovs, while *P. marinus* is exotic to Australia, *P. olseni* infections in New South Wales and South Australia have resulted in severe depletion of abalone stocks and production losses through ill-thrift and mortality.

'This project will address the need for on-going development of reliable, sensitive and specific molecular diagnostic methods for diagnosis of infections in both wild and cultured molluscs,' Nick said.

'Since *Perkinsus* was first described in Australian abalone, histology and culture in Ray's thioglycolate medium have been the most commonly applied diagnostic procedures. Although these tests are relatively straightforward and practical, they are general in nature and neither identifies nor differentiates specific species of *Perkinsus*.'

Through the development and application of molecular methods, such as real-time qPCR, detailed diagnostic information of which *Perkinsus* species are associated with disease will enable the development of a wider understanding of *Perkinsus* in affected populations and will underpin more informed decisions on disease control and stock management.

'With the help of State Government departments, abalone populations previously shown to be infected with *Perkinsus* will be sampled to obtain infected tissues and to establish in vitro cultures of the parasite,' Nick said. 'This will not only provide a source of material for detailed DNA sequence analysis, but will provide a future source of research material for scientists.

'DNA sequence analysis will provide data for the design of species-specific molecular assays and will help to better define which *Perkinsus* species we have in Australia.'

The development of improved molecular tests for *Perkinsus* will expand Australia's capability for the diagnosis of internationally significant diseases in the aquatic environment and will further serve to

support biosecurity and trade through an improved understanding of *Perkinsus* in commercially important mollusc populations.

The AAHL Fish Diseases Laboratory will undertake this work in collaboration with the Department of Fisheries – Western Australia, Marine Innovation South Australia and the New South Wales Department of Industry and Investment.

In recognition of the increasing importance of aquaculture within the Australian economy, the Australian Government through the Fisheries Research and Development Corporation has contributed $300,000 to fund this project.

Completed AAHS Project Summaries

Project No. 2008/039: AAHS: Strategic planning, project management and adoption (PI: Mark Crane)

The Aquatic Animal Health Subprogram (FRDC 2008/039) was completed in May 2012. In addition, I am pleased to report that the Subprogram has been renewed for a further 4 years (2012-16) – FRDC Project 2012/001. The following is a summary of Project 2008/039.

OBJECTIVES:

1. To administer and co-ordinate the activities of the AAHS
2. To manage a portfolio of R&D projects that are directly concerned with aquatic animal health and are not covered by other FRDC subprograms
3. To facilitate meetings of the AAHS Steering and Scientific Advisory Committees
4. In consultation with key stakeholders (industry and aquatic animal health specialists) develop strategic directions for aquatic animal health R&D
5. To disseminate information and results through: a) a biennial scientific conference; b) specialist workshops on topics identified through AAHS business c) *Health Highlights* Newsletter; d) relevant articles in FRDC News *FISH* and e) the FRDC website

NON TECHNICAL SUMMARY

OUTCOMES ACHIEVED TO DATE

The overall outcome of this project has been the successful facilitation, administration and promotion of the FRDC Aquatic Animal Health Subprogram (AAHS) over the period from July 2008 to May 2012. During this period the AAHS has managed a total of 30 projects through which improved diagnostic and health management capability at the local, state and national levels has been delivered. Moreover, aquatic animal disease awareness has been enhanced and disease emergency management capability at industry and government levels has been improved. Thus Australia's capability to be prepared for, and respond to, aquatic animal disease emergencies has been greatly enhanced.

AAHS projects were developed following FRDC procedures, ensuring that research undertaken addressed aquatic animal health issues of highest concern and that duplication of research was avoided. The AAHS' bi-annual newsletter *Health Highlights* reported on progress made in these projects.

The AAHS R&D Plan, "AQUATIC ANIMAL HEALTH SUBPROGRAM Strategic Plan 2002-2008", developed to guide the Subprogram to accomplish its objectives, was reviewed and updated to "AQUATIC ANIMAL HEALTH SUBPROGRAM Strategic Plan 2009-2012". Subsequently, it was reviewed on a regular basis to ensure that it remained current.

The Fourth National FRDC Scientific Conference on Aquatic Animal Health was held in July 2009 (63 registrations). For 2011, the conference (First FRDC Australasian Scientific Conference on Aquatic Animal Health) was opened to international participants (125 registrations). In addition to industry representatives, aquatic animal health specialists, including representatives from governments, universities and other academic institutions, participated in each of the conferences. These conferences play an important role in the communication function of the Subprogram, with a large proportion of its projects discussed. In addition, the conferences are open to all interested parties and non-FRDC-funded research was included in the programs. The 2011 conference was followed by the International Workshop on Ostreid Herpesvirus. Sponsorship of this workshop by FRDC facilitated attendance by international experts, including representatives from international aquatic animal health organisations (OIE and EFSA). The workshop report provides the most up-to-date information on this virus and has been distributed internationally.

In summary, the AAHS has been able to enhance aquatic animal health R&D outputs, strengthen the network of aquatic animal health experts and research providers, and provide training opportunities for young scientists interested in aquatic animal health. Furthermore, AAHS has maintained its linkages to Animal Health Committee, through the Sub-committee on Aquatic Animal Health as well as peak industry groups to ensure that the strategic direction for investment in aquatic animal health is maintained.

KEYWORDS: aquatic animal health; disease

Project No. 2011/046: Disease risk assessment for abalone stock enhancement (PI: Richard Stevens)

OBJECTIVES:

1. Independent risk assessment of the raw biosecurity risks posed by the commercial scale abalone stock enhancement.
2. Independent risk assessment of the residual biosecurity risks posed by the commercial scale abalone stock enhancement, following staged implementation of risk mitigation measures.

OUTCOMES ACHIEVED TO DATE

The major output was a rigorous risk assessment, featuring an evaluation of the raw and residual risk of abalone stock enhancement.

The outcome is that this will greatly assist in understanding whether the health status of abalone industries can reasonably be protected, during any commercial scale abalone stock enhancement.

This outcome was achieved, with the participation of the majority of WA industry and a number of interstate observers in the first two days of the risk assessment process. It highlighted the need for any stock enhancement project to be part of an integrated, whole of industry, targeted surveillance and biosecurity program to establish and maintain the health status of Western Australia's abalone herd(s).

Both commercial fishery and aquaculture industries discovered the need to understand the risks; the control measures associated with biosecurity to ensure the long-term productivity, sustainability and value of fisheries resources are adequately protected. Outcomes have social and community implications through adjunct protection of the recreational fishery for abalone, and natural biodiversity.

This outcome was achieved, with the participation of the majority of industry in the first two days of the risk assessment process. It highlighted (1) the need for state authority to provide a biosecurity quality management system that provides, continuously, basic biosecurity conditions, which will enable WA to maintain the health status of its abalone herd(s); and (2) commercial fishery sector should improve its biosecurity risk managements to ensure it consistently meets its own and the State's standards of biosecurity.

The nature of Australia's seafood industry has necessitated the translocation of aquatic organisms within and between jurisdictional boundaries. This comes with a number of inherent risks for any receiving environment. To manage these risks, decision making authorities, under the auspices of the *"National policy for the translocation of live Aquatic Organisms – issues, principles and guidelines for Implementation* (Anon. 1999), use scientifically based hazard pathways, risk analysis and risk control measures to determine, if a translocation can be undertaken with an appropriate level of protection (ALOP).

Abalone stock enhancement remains one of the few viable alternatives for increasing the profitability and biomass of a fishery without compromising the current fishery in terms of access or allowable catches (Hart, Farbris & Daume, 2007). Economically viable stock enhancement could provide the fishery with stock numbers towards virgin levels, thus increasing catch rates and ultimately economic efficiency and profitability.

Relatively few abalone diseases are known worldwide. This has been recognised to be a result of the lack of examination (absence of proof, rather than proof of absence). In this context, this study, utilising an expert and technical panels, undertook a disease risk assessment of abalone stock enhancement to determine what risk control measures are required to mitigate the inherent risks. The method used was consistent with both the Australian Standard AS/NZS 4360 and ISO 31000:2009

The study found that a range of risk control measures would enable the stocking of open systems with aquatic animals of higher than or equal health status to that of aquatic animals already living in the considered areas.

Based on the panel's discussion the report made following suggestions regarding basic biosecurity conditions and quality management systems:

<u>Basic Biosecurity Conditions</u>

- Need to be in place for two years before beginning the venture;
- Integrated industry biosecurity management for the entire abalone industry;
- Allow the movement of stock between areas of equivalent health status;
- Aquaculture farm(s) would benefit from establishing 'compartment freedom' from notifiable diseases;
- The authorities should establish the health status of wild stock (absence of proof, rather than proof of absence) to enable zoning of areas and/or setting of biosecurity management areas.

<u>Quality Management System (QMS)</u>

- Should be based on ISO 9001;
- Setting of biosecurity planning and develop standards for fishing, farming and stock enhancement,
- The setting of biosecurity audit guidelines, independent certification and compliance;
- Incorporation for regulation and penalties for biosecurity matters for processors, fishers and

farmers, including legal powers to control all activities, in case of emergency disease incident;
- Need for compulsory disease reporting in all sectors;
- Build capacity in Industry emergency response preparedness; disease recognition; and
- Annual audit and review of effectiveness of the biosecurity QMS.

KEYWORDS: Risk Assessment, abalone, stock enhancement, aquaculture

Progress Summaries for Active AAHS Project

Project No. 2011/053: Aquatic Animal Health Subprogram: Pacific oyster mortality syndrome (POMS) - understanding biotic and abiotic environmental and husbandry effects to reduce economic losses (PI: Richard Whittington)

Rather than provide the extensive project report here, the project team has created a blog for the project which has received a very favourable response from industry; it contains an illustrated description of the project and the main results to date:
www.oysterhealthsydney.org

Project No. 2011/043: Aquatic Animal Health Subprogram: Understanding and planning for the potential impacts of OsHV-1 µVar on the Australian Pacific oyster industry (PI: Tom Lewis et al.)

This project is close to completion and much of the work has been placed on the industry website as the project has progressed:
The project's first stage, a desktop analysis and subsequent development of extension materials (see Q & A Fact Sheets in Current Position and Future Plans for the Australian Industry report http://www.oysterstasmania.org/news/poms-question-a-answer-fact-sheets-now-available) was significantly informed by the deliberations and Final Report of the International OsHV-1 µVar Workshop that followed the Aquatic Animal Health Conference in Cairns in July 2011 (see http://www.oysterstasmania.org/downloads/Oyster-Herpes-Virus-Workshop-Final-Report-111107.pdf) and was released in November 2011. The second stage of the project, the study tour to France, significantly increased the understanding of the oyster industry about the adverse affects of POMS and the strategies, including extension, research and development that are needed if we hope to successfully combat the virus in Australia. The report of the France study tour is available on line: http://www.oysterstasmania.org/news/frdc-poms-project-study-tour-to-france-final-report.

The third stage of this project, the development of a POMS strategy document focuses on the potential movement of the virus into other Pacific oyster production areas around Australia and the need to summarise current information and desired outcomes and actions; a discussion of current understandings and opinions regarding POMS by industry and government; and making recommendations regarding four key industry issues associated with the virus, including:

• Emergency Response Protocols
• Tracking Oyster Movements
• Monitoring POMS
• Hatchery Protocols

There has been extensive consultation with growers from all states, DAFF and AAHL during the development of this project and the identification of the four key issues above.

The Current Position and Future Plans for the Australian Industry report is based on research, interviews with key industry and government stakeholders and input from the Oysters Australia National POMS advisory group.

It is recognized that the final strategy document's recommendations will need to be accepted and endorsed by appropriate industry, science and regulatory agencies before the next phase of POMS investment, extension and research can commence. It is also recognized that a considerable amount of research and progress towards strategically *managing* POMS has been undertaken (and is the process of being undertaken) since the original project application was developed in 2011.

Project No. 2012/032: Aquatic Animal Health Subprogram: Pacific oyster mortality syndrome (POMS) – risk mitigation, epidemiology and OsHV-1 biology (PI: Richard Whittington)

Rather than provide a summary progress report for this project report here, the project team has created a blog where information can be found:
www.oysterhealthsydney.org

Project No. 2010/034: Aquatic Animal Health Subprogram: Investigation of an emerging bacterial disease in wild Queensland gropers, marine fish and stingrays with production of diagnostic and epidemiological tools to reduce the spread of disease to other states of Australia

This collaborative project is progressing very well. Rather than report on progress here please see the recent publication:

Bowater RO, Forbes-Faulkner J, Anderson IG, Condon K, Robinson B, Kong F, Gilbert GL, Reynolds A, Hyland S, McPherson G, O'Brien J & Blyde D. 2012. Natural outbreak of *Streptococcus agalactiae* (GBS) infection in wild giant Queensland grouper, *Epinephelus lanceolatus* (Bloch), and other wild fish in northern Queensland, Australia. *J Fish Dis* **35:** 173–186.

Project No. 2009/032: Aquatic Animal Health Subprogram: Development of molecular diagnostic procedures for the detection and identification of herpes-like virus of abalone (*Haliotis* spp.)

Progress on this collaborative project is progressing well. Recent publications, and presentations at industry/scientific meetings, include:

Corbeil S, Williams N, Moody N, Cowley J, McColl K, Bergfeld J, Hyatt A, Crameri S, Mackay E, Wong F, Colling A, Mohammad I, Fegan M, Warner S, Savin K, Murdoch B, Cogan N, Sawbridge T, Crane, M. Abalone viral ganglioneuritis: Current status of research. 5th National Abalone Convention, Hamilton Island, Queensland, 21-23 July 2011.

Cowley JA, Corbeil S, Bulach D, Moody NJ, Ellard K, Fegan M, Savin K, Warner S, Crane MStJ. Complete genome sequences of abalone herpesvirus (AbHV) strains from Victoria and Tasmania provide insights into its origin and identify variations useful for epidemiology. International Abalone Symp., Hobart, Tasmania, Australia, 6-11 May, 2012.

Corbeil S, Williams LM, Gannon V and Crane MStJ. Evaluation of abalone viral ganglioneuritis resistance amongst wild abalone populations along the Victorian coast. International Abalone Symp., Hobart, Tasmania, Australia, 6-11 May, 2012.

Corbeil S, Williams LM, Bergfeld J, Crane MStJ. 2012. Abalone herpes virus stability in sea water and susceptibility to chemical disinfectants, *Aquaculture* **326**: 20-26.

Corbeil S, McColl KA, Williams LM, Mohammad I, Hyatt AD, Crameri SG, Fegan M and Crane MStJ. 2012. Abalone viral ganglioneuritis: Establishment and use of an experimental immersion challenge system for the study of abalone Herpes virus infections in Australian abalone. *Virus Res* **165:** 207-213.

Summary of Active Projects

Project No.	Project Title	Principal Investigator
2008/041	AAHS: Tools for investigation of the nodavirus carrier state in marine, euryhaline and freshwater fish and control of NNV through integrated management (*Associated species:* multi-species)	Prof Richard Whittington University of Sydney, Camden, NSW Phone: 02 9351 1619 Email: richardw@camden.usyd.edu.au
2009/032	AAHS: Characterisation of abalone herpes-like virus infections in abalone (*Associated species: Haliotis* spp.)	Dr Mark Crane CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5118 Email: mark.crane@csiro.au
2009/044	AAHS: Surveys of ornamental fish for pathogens of quarantine significance (*Associated species:* multi-species)	Prof Richard Whittington University of Sydney, Camden, NSW Phone: 02 9351 1619 Email: richardw@camden.usyd.edu.au
2009/315	PD Program: Scholarship program for enhancing the skills of aquatic animal health professionals in Australia (*Associated species:* multi-species)	Jo-Anne Ruscoe FRDC Phone: 02 6285 0423 Email: jo-anne.ruscoe@frdc.com.au
2010/034	AAHS: Investigation of an emerging bacterial disease in wild Queensland gropers, marine fish and stingrays with production of diagnostic tools to reduce the spread of disease to other states of Australia (*Associated species*: multi-species)	Dr Rachel Bowater DEEDI, Biosecurity Queensland Phone: 07 4760 1592 Email: rachel.bowater@deedi.qld.gov.au
2010/036	AAHS: Improved fish health management for integrated inland aquaculture through Better Management Practices (BMPs) (Associated species: *Maccullochella* spp)	Dr Tracey Bradley DPI Victoria Phone: 03 9217 4171 Email: tracey.bradley@dpi.vic.gov.au
2011/003	AAHS: Investigations into the genetic basis of resistance to infection of abalone by the abalone herpes-like virus (Associated species: *Haliotis* spp)	Dr Serge Corbeil CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5254 Email: serge.corbeil@csiro.au
2011/004	AAHS: Development of Improved Molecular Diagnostic Tests for *Perkinsus olseni* in Australian molluscs (*Associated species*: multi-species)	Mr Nick Gudkovs CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5456 Email: nicholas.gudkovs@csiro.au
2011/005	AAHS: Investigation of inclusions in Australian prawns (*Associated species*: multi-species)	Dr Melanie Crockford Dept Fisheries WA Phone: 08 9368 3205 Email: mcrockford@agric.wa.gov.au
2011/043	AAHS: Understanding and planning for the potential impacts of OsHV1 on the Australian Pacific oyster industry (*Associated species*: Pacific oyster)	Dr Tom Lewis RDS Partners Pty Ltd Phone: 03 6231 9033 Email: tom.lewis@ruraldevelopmentservices.com
2011/048	Tactical Research Fund - AAHS: Determining the susceptibility of Australian species of prawns to infectious myonecrosis (*Associated species*: multi-species)	Dr Mark Crane CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5118 Email: mark.crane@csiro.au
2011/053	AAHS: Pacific oyster mortality syndrome (POMS) - understanding biotic and abiotic environmental and husbandry effects to reduce economic losses (*Associated species*: Pacific oyster)	Prof Richard Whittington University of Sydney, Camden, NSW Phone: 02 9351 1619 Email: richardw@camden.usyd.edu.au
2011/245	Research methods to manage pathogenic microbiological and biological organisms within a redclaw (*Cherax quadricarinatus*) egg incubator hatchery to improve survival and reliability	AquaVerde Redclaw Hatchery & Farm Phone: 07 4091 2020 Email: info@aquaverde.com.au

	(*Associated species*: *Cherax quadricarinatus*)	
2012/001	AAHS: Strategic planning, project management and adoption (*Associated species*: multi-species)	Dr Mark Crane CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5118 Email: mark.crane@csiro.au
2012/002	Aquatic Animal Health Technical Forum (*Associated species*: multi-species)	Nette Williams CSIRO AAHL Fish Diseases Laboratory Phone: 03 5227 5442 Email: lynette.williams@csiro.au
2012/032	AAHS: Pacific oyster mortality syndrome (POMS) - risk mitigation, epidemiology and OsHV-1 biology (*Associated species*: Pacific oyster)	Prof Richard Whittington University of Sydney, Camden, NSW Phone: 02 9351 1619 Email: richardw@camden.usyd.edu.au

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