

VISITING EXPERT: DR DOUG TOCHER

Dr Kathy Schuller, Flinders University



AUSTRALIAN
SEAFOOD
COOPERATIVE
RESEARCH CENTRE

Project No. 2009/740

Copyright Australian Seafood CRC and University of Tasmania 2009

This work is copyright. Except as permitted under the Copyright Act 1968 (Cth), no part of this publication may be reproduced by any process, electronic or otherwise, without the specific written permission of the copyright owners. Neither may information be stored electronically in any form whatsoever without such permission.

ISBN: 978-1-925982-13-8

PROJECT NO: 2009/740 TITLE: Visiting Expert: Dr Doug Tocher

PRINCIPAL INVESTIGATOR: Dr Kathy Schuller

ADDRESS: School of Biological Sciences, Flinders University

OBJECTIVES OF VISITING EXPERT: Dr Tocher is based at the Institute of Aquaculture at Stirling University in Scotland and he is internationally-recognized for his work as a research scientist in the area of finfish lipid and fatty acid nutrition. He has been a partner in a number of large European Union fish nutrition research projects. Thus, the objectives of his visit were: (1) to exchange information about the most recent developments in finfish lipid and fatty acid nutrition in Europe and Australia and (2) to hold a workshop to develop international collaborative research projects between the Seafood CRC and the Institute of Aquaculture at Stirling University.

NON TECHNICAL SUMMARY:

Dr Tocher met for technical discussions with research providers at SARDI Aquatic Sciences (Dr David Stone and Ms Jenna Bowyer), Adelaide University (Prof. Bob Gibson's laboratory) and Flinders University (Dr Kathy Schuller's laboratory). He also visited the Lincoln Marine Science Centre in Port Lincoln where he received a research update from Dr Trent D'Antignana (Flinders University) and Mr Mike Thomson (Research Manager, Clean Seas Tuna). The culmination of Dr Tocher's visit was a symposium on finfish lipid and fatty acid nutrition and the human health implications held at Flinders University on Thursday October 8, 2009. The symposium was attended by approximately 25 people including Dr Richard Smullen from Ridley Aquafeed and Dr Graham Mair from the Seafood CRC as well as researchers from Flinders University, Adelaide University, the Royal Adelaide Hospital, SARDI and Deakin University. Talks at the symposium included "Fish oil replacement in Europe" (Dr Tocher), "Unmet clinical needs for fish oil" (Dr Les Cleland, Royal Adelaide Hospital), "Lipid oxidation affecting the marketability of fish fillets" (Dr John Carragher, SARDI), "Fish cell cultures as an *in vitro* platform for investigating oxidative stress....." (Dr Peter Bain, Flinders University), "Effect of dietary alpha-linolenic acid level on the regulation of omega-3 lipid synthesis....." (Ms Wei-Chun Tu, Adelaide University) and "Cloning and functional characterization of a fatty acyl elongase from southern bluefin tuna" (Ms Melissa Gregory, Flinders University).

The symposium was followed by a workshop to discuss possible future collaborative research projects in the area of finfish lipid nutrition. Graham Mair gave an overview of the research priorities of the Seafood CRC and Richard Smullen gave the industry

perspective. The workshop resulted in a cluster of proposed Seafood CRC Honours projects adding value to the feeding trials planned within “Sustainable Feeds and Feed Management for Yellowtail Kingfish” (under development with Dr David Stone as coordinator) and “Understanding Yellowtail Kingfish” (already approved with Dr Trent D’Antignana as coordinator).

OUTCOMES ACHIEVED TO DATE

OUTPUTS DEVELOPED AS RESULT OF VISITING EXPERT

Dr Tocher’s visit resulted in the development of the concept for FANSRIN (Finfish Aquaculture Nutrition Student Research Innovation Network) and 8 Honours project proposals to come under the umbrella of FANSRIN and to add value to “Sustainable Feeds and Feed Management for Yellowtail Kingfish” and “Understanding Yellowtail Kingfish”. The concept for FANSRIN and the 8 Honours projects were submitted to the Seafood CRC in response to the round 4 call for Honours project proposals. This resulted in 6 out of the 8 Honours projects being funded by the CRC and provisional approval for the concept of FANSRIN. The Honours projects have been approved for funding and discussions are currently on-going regarding the funding of FANSRIN. It is proposed that the PhD, Masters and Honours students adopted into FANSRIN will meet 4 times a year at the various locations (Flinders University, Roseworthy, Lincoln Marine Science Centre and University of the Sunshine Coast) for detailed technical discussions in the area of finfish nutrition. One of the Honours projects involves the student visiting Dr Tocher’s laboratory in Scotland to learn how to investigate lipid metabolism using ¹⁴C-labelled fatty acids and to bring this technology back to South Australia. This is envisaged to catalyze the development of more extensive collaborations with Dr Tocher’s laboratory

BACKGROUND AND NEED

There is a need for Australian aquaculture research and industry personnel to learn from the experience of overseas scientists from countries where aquaculture has a long history such as Scotland. This project provided a range of opportunities for exchange of information and for the development of ongoing collaboration between Seafood CRC participants and Dr Tocher's laboratory at the Institute of Aquaculture at Stirling University in Scotland.

RESULTS

The major results were: (a) a workshop to develop cutting-edge research projects in finfish aquaculture nutrition for yellowtail kingfish and southern bluefin tuna; (b) development of the concept for FANSRIN; (c) approval by the Seafood CRC of a suite of 6 Honours projects under the umbrella of FANSRIN; and (d) at least one Honours project which maintains the link with Dr Tocher's laboratory in Scotland.

EXTENSION ACTIVITIES

Dr Schuller wrote an article for Seafood Stories. Students under the umbrella of FANSRIN will be expected to communicate their research findings at various Seafood CRC forums during the year 2010.

PROJECT OUTCOMES (THAT INITIATED CHANGE IN INDUSTRY OR RESEARCH)

This visit by Dr Tocher resulted in significant value adding to the "Sustainable Feeds and Feed Management for Yellowtail Kingfish" and "Understanding Yellowtail Kingfish" projects by the addition of 6 Honours projects to these larger projects. The Honours projects are relatively low budget/high innovation projects which have the potential to point the way to promising new research directions that might ultimately be mainstreamed into the larger Seafood CRC projects. FANSRIN will act as a catalyst to bring students, their supervisors and their industry mentors together for regular and detailed technical discussions which are likely to foster further innovation while at the same time maintaining the relevance to the industry.

SUMMARY OF CHANGE IN INDUSTRY AND RESEARCH (WHAT IMMEDIATE CHANGES ARE EXPECTED)?

The major changes are the value adding to the "Sustainable Feeds and Feed Management for Yellowtail Kingfish" and "Understanding Yellowtail Kingfish" projects and the establishment of FANSRIN a specialist network for students, research and industry personnel focused on finfish nutrition.

WHAT FUTURE AND ONGOING CHANGES ARE EXPECTED?

It is expected that the pilot projects run by the FANSRIN students will lead to larger projects with a greater focus on innovation while at the same time maintaining the focus on industry needs.

FURTHER ACTION REQUIRED IN REGARDS TO COMMUNICATION?

Once FANSRIN has been established and once we start holding our regular meetings, we will produce conference proceedings summarizing the work of the students in the network. This will include both technical and non-technical summaries of the work.

FURTHER ACTION REQUIRED IN REGARDS TO COMMERCIALISATION? (IP PROTECTION, LICENSING, SALES, REVENUE ETC)

Not applicable at this stage.

LESSONS LEARNED AND RECOMMENDED IMPROVEMENTS?

Not applicable

ACKNOWLEDGEMENTS

Dr Kathy Schuller would like to thank the administrative staff of the School of Biological Sciences, Flinders University who helped with Dr Tocher's travel and accommodation arrangements, the booking of conference rooms and the organization of catering.

APPENDIX (IF APPLICABLE)