

RESEARCH IN PROGRESS

The effects of pollutant exposure on the soft tissues and shell structure of molluscs

Description: Understanding the effects of complex pollutant exposure on the growth and development of soft tissues and shell structure of molluscs, CSU Competitive grant and Deakin University, \$26,000. Dr Julia Howitt (ILWS) and Dr Julie Mondon (Deakin University). 2009-2011

Objectives:

Changes in the structure and function of both soft tissue and shells of the Pacific Oyster, *Crassostrea gigas*, associated with exposure to a mix of heavy metal and organic pollutants are being examined. A range of analytical and imaging techniques will be used to look for correlations between alterations in structure and changes in chemical composition (at large and fine scales). The data will add to the existing knowledge of the impact of contaminant exposure on the health of oysters and the function of their digestive and reproductive organs. While it is known that oyster shell can accumulate some heavy metals we have a very limited understanding of the impact this accumulation can have on the function of the shell and the overall health of the organism. This project is a comprehensive analysis of the role of heavy metal exposure in causing substantial changes to the deposition of the calcium carbonate structures that make up the shells of these organisms. This work may lead to the development of oyster shell assessment as an biological indicator of pollutant exposure in estuaries and may also be of interest to the commercial oyster and pearl industries.

Methods:

Oysters were collected from two estuaries at a range of distances from point sources of contamination. Samples are being analysed using a wide range of techniques including histological examination of the soft tissues, chemical analysis of sediments, shells and soft tissues for heavy metals and organic contaminants, scanning electron microscopy for the examination of shell structure, laser ablation ICP-MS for fine scale analysis of trace metal concentrations in

shell samples and the XFM beamline at the Australian Synchrotron for very fine scale trace metal mapping in key samples.



Findings to date:

Analysis is ongoing but there is evidence of alterations to both the soft tissue and shells of the oysters associated with the highest levels of industrial contamination.

Publications:

Julie Mondon, Julia Howitt (2011) *Links between complex pollutant exposure and structural alterations in soft tissue and shell of bivalve molluscs*, Paper presented at Primo 16, Longbeach California, USA, 15-18th May 2011.

Julie Mondon, Casey Hawkey, Julia Howitt, (2010) *Digestive tubule atrophy as a biomarker of industrial contamination exposure in the pacific oyster Crassostrea gigas from Tasmanian estuaries* Poster presented at AMSA2010, 4-8 July Wollongong, NSW.

Julie Mondon, Casey Hawkey, Julia Howitt, (2010) *Digestive Tubule Atrophy in the Pacific Oyster Crassostrea Gigas, as a Biomarker of Complex Industrial Contamination Exposure* Paper presented at 6TH International Conference on Marine Pollution and Ecotoxicology, 31 May – 3 June, 2010 (Hong Kong).

Julia Howitt, Julie Mondon. (2010) *Shell structural abnormalities in the Pacific Oyster, Crassostrea gigas: an indicator of complex industrial contamination exposure?* RACI 2010 Conference, Melbourne Convention and Exhibition Centre, 4-8 July 2010.

CONTACT:

Dr Julia Howitt
CSU Wagga Wagga
Jhowitt@csu.edu.au

Albury-Wodonga Campus

PO Box 789

Elizabeth Mitchell Drive, Thurgoona

ALBURY NSW 2640

Australia

TEL +61 2 6051 9992

FAX +61 2 6051 9797

EMAIL ilws@csu.edu.au