

QUALIFICATIONS

BSc (Hons) Marine Biology, University of Wales, 1992

MSc Shellfisheries, biology & culture, University of Wales, 1994

PhD Animal Physiology, University of Canterbury, 2003



PROFESSIONAL AFFILIATIONS

- Society for Experimental Biology
- Malacological Society (London)
- Royal Society of New Zealand
- Australia-NZ Society for Comparative Biochemistry and Physiology
- NZ Marine Sciences Society

ROLE AT CAWTHRON

Norman leads the physiology team at Cawthron, drawing on a background of work in the aquaculture industry combined with training as a classical biologist focusing on physiology. This is brought to bear in a range of projects where the physiology of aquaculture species is a key issue e.g. quantifying stress and resilience in shellfish, identifying resource-efficient mussels for use in selective breeding, development of larval rearing systems, examining the effects of climate change on aquaculture species and enhancing meat quality and yield through good harvest practice.

SPECIAL INTERESTS & ACHIEVEMENTS

The introduction of cutting-edge tools and rigorous scientific discipline to optimise the effectiveness of aquaculture research.

To champion the concept of true sustainability in primary industry; the ultimate objective being to minimise / eliminate net environmental impact while optimising productivity.

SELECTED PUBLICATIONS

Ragg NLC, King N, Watts E, Morrish J 2010. Optimising the delivery of the key dietary diatom *Chaetoceros calcitrans* to intensively cultured Greenshell™ mussel larvae, *Perna canaliculus*. *Aquaculture* 306, 270-280.

Petrone L, Ragg NLC, Girvan L, McQuillan AJ 2009. Scanning Electron Microscopy and Energy Dispersive X-Ray Microanalysis of *Perna canaliculus* Mussel Larvae Adhesive Secretion. *Journal of Adhesion* 85, 78-96.

Petrone L, Ragg NLC, McQuillan AJ 2008. In situ infrared spectroscopic investigation of *Perna canaliculus* mussel larvae primary settlement. *Biofouling* 24, 405-413.

Allen VJ, Marsden ID, Ragg NLC, Gieseg S 2006. The effects of tactile stimulants on behavior, feeding, growth and meat quality of cultured Blackfoot abalone, *Haliotis iris*. *Aquaculture* 257, 294-308.

Ragg NLC, Taylor HH 2006. Oxygen uptake, diffusion limitation, and diffusing capacity of the bipectinate gills of the abalone, *Haliotis iris*. *Comp. Biochem. Physiol. A*. 143, 299-306.

Ragg NLC, Taylor HH 2006. Heterogeneous perfusion of the paired gills of the abalone *Haliotis iris*: an unusual mechanism for respiratory control. *J. Exp. Biol.* 209, 475-483.

Taylor HH, Ragg NLC 2005. The role of body surfaces and ventilation in gas exchange of the abalone, *Haliotis iris*. *J. Comp. Physiol. B*. 175(7), 463 – 478.

Taylor HH, Ragg NLC 2005. Extracellular fluid volume, urine filtration rate and haemolymph mixing time in the abalone, *Haliotis iris*: a comparison of 51Cr-EDTA and 14C-inulin as extracellular markers. *Mar. Freshw. Res.* 56, 1117-1126

Allen VJ, Marsden ID, Ragg NLC 2001. The use of stimulants as an aid to wean fishery caught blackfoot abalone (*Haliotis iris*) to artificial food. *Journal of Shellfish Research* 20 (2): 647-651.

Shpigel M, Lupatsch I, Neori A, Ragg NLC 2000. Protein content determines the nutritional value of the seaweed *Ulva lactuca* for the abalone *Haliotis tuberculata*, *H. discus hannai*, and *H. fulgens*. *J. Shell. Res.* 19 (1): 534.

Shpigel M, Ragg NLC, Lupatsch I, Neori A 1999. Protein content determines the nutritional value of the seaweed *Ulva lactuca* L. for the abalone *Haliotis tuberculata* L. and *H. discus hannai* Ino. *Journal of Shellfish Research* 18 (1): 227-233.