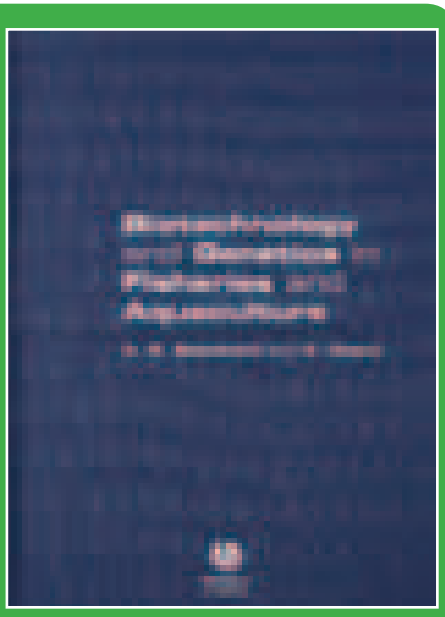
Biotechnology and Genetics in Fisheries and Aquaculture. A.R. Beaumont and K. Hoare Blackwell Sciences Ltd Oxford. 2003. 176 pages Price c. £40



Molecular genetics and biotechnology have undergone a revolution over the past decade. Novel approaches, largely developed to service and exploit the Human Genome Project and associated programmes, have been rapidly adopted by the wider scientific community. Fish science is no exception. The authors of this book aim to produce "an introductory-level text which can explain to both students and professionals in fisheries and aquaculture what the new technologies in molecular biology and genetics have to offer." How successful they have been depends, to some extent, on one's definition of 'new' technology.

This is a relatively compact book comprising 140 pages of text, together with a 13 page glossary and 4 page index. While each chapter concludes with some 'Suggested Reading' there is little cited material and no bibliography.

Chapter 1 competently outlines the basics of genetic biochemistry and variation. The second chapter, outlining methodologies employed for measuring this variability, is less accomplished. It would benefit from clearer and more accurate prose and a more consistent approach (e.g. provision of illustrations and examples of the successful application for each marker type). The third chapter, the only one dedicated to wild fisheries, is restricted to aspects of population structure as revealed by genetic markers and conservation issues. These are well explained but largely exemplified from an allozyme based perspective. Less emphasis is given to mitochondrial and microsatellite based studies. The strengths of these more modern approaches in, for example, phylogeography, behavioural ecology, analysis of archived samples and elucidation of reproductive strategies, receive comparatively little, if any, attention. Chapters 4-6 focus on genetic aspects of aquaculture; namely genetic variability in the hatchery, artificial selection and ploidy manipulations. These provide excellent coverage of well established ideas and practices within aquaculture. A notable omission is the topical issue of domestication selection and its relevance to supportive breeding efforts. Incongruously, chapter 4 also includes a succinct explanation of the methodology behind genome mapping, although the strategic importance of such maps in applied genetics is not established. Chapter 7 covers an overtly biotechnological issue; genetic engineering in aquaculture. This final chapter is well constructed and written, dealing with theoretical, practical and ethical aspects of this controversial subject. However, it is confined by the authors limited definition of genetic engineering as transfer of genes between species.

Despite the broadly scoped title and aims, the authors concentrate primarily on describing proven, practical technologies related to aquaculture. At this level, the book provides a competent introduction for the novice reader, although its value is undermined by the lack of a comprehensive bibliography. Apart from the final chapter, genetic advances within fish sciences in the past five or so years are not well covered. During this period the draft genome sequence for Fugu has been produced, zebrafish and medaka genome sequencing projects are well advanced and several genome linkage maps (e.g. tilapia & rainbow trout) and QTL mapping studies published. Other fish genome resources have been rapidly expanded (e.g. EST databases, BAC libraries), microarray and SNP (single nucleotide polymorphism) technologies embraced, and comparative genomics exploited to isolate and characterise fish genes. For an introduction to these and other advances, and their relevance to applied fisheries science, the reader will need to look elsewhere.

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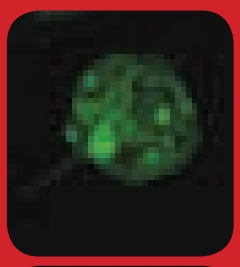
New Bioimaging Facility

This year saw the installation of the first component of the Institute's new Bioimaging Facility. The Bioimaging Facility, which builds substantially upon the capabilities of the old electron microscope suite, will see the completion of equipment installation in early 2005 and is to be managed by Linton Brown and James Bron. The first microscope, installed at the end of 2003, was a Wellcome-funded confocal laser scanning microscope (CLSM). The purchased machine is a multi-spectral Leica TCS SP2 AOBS running on an inverted microscope and equipped with 5 laser lines ranging from near UV (405 nm) to far red (633 nm). This machine, one of the best-specified in Scotland, allows researchers to carry out high resolution imaging of cells, tissues and whole organisms, bridging the gap between light microscopy and electron microscopy. In particular, it allows simultaneous imaging of multiple fluorescently-labelled targets, these targets representing, for example, different proteins (e.g. using antibody labelling) or simultaneously expressing genes (e.g. using in situ hybridisation). The microscope can also be used to capture time series (e.g. developmental changes) or follow physiological changes. Confocal work undertaken so far includes work on the structure of *Tetracapsuloides bryosalmonae*, the causative organism of PKD by Charlie McGurk and Dave Morris, in situ work on the myxosporean *Sphaerospora truttae* by Astrid Holzer, investigation of the portals of entry of pathogenic bacteria into fish eggs by Kim Thompson and Tom Wiklund, studies of viral infection in cultured cells by Kim Thompson and studies of rickettsial infection by Una McCarthy.

Over the following year the Bioimaging Facility will also see the delivery of a SRIF-funded high specification low vacuum scanning electron microscope with cryo-preparation and elemental analysis capabilities and a research grade transmission electron microscope with 3D-tomography capabilities. As part of the Bioimaging Facility, image analysis and image processing software required to support the microscopy capabilities will be installed in the Institute's new bioinformatics suite.



Confocal microscope image of an infective spore of the PKD organism *Tetracapsuloides bryosalmonae* showing the cellular components of the spore.

Diagrammatic reconstruction of the spore components of *Tetracapsuloides bryosalmonae* based on confocal microscope observations.