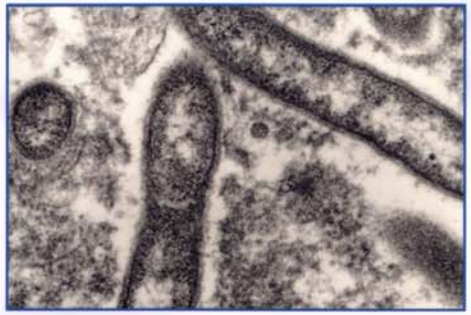
LINK AQUACULTURE TRT10- DEVELOPMENT OF VACCINATION METHODS FOR THE CONTROL OF RAINBOW TROUT FRY SYNDROME (RTFS)

by R. E. Rangdale[1] and R. E Campbell[2]

Introduction

Rainbow Trout Fry Syndrome (RTFS) continues to cause notable problems for the industry and is considered to be among the most significant diseases in rainbow trout fry production. Existing research has demonstrated that vaccine preparations do not elicit adequate levels of protection in fry. This may be because they contain inappropriate antigens, protective antigens lack immunogenicity, or the disease itself causes immune suppression. Currently, no commercial vaccine is available, and the development of such remains a long-term goal of the industry, particularly of those involved in on-growing fish for the table market.

Rainbow trout fry (3.0 g) showing signs of RTFS



Electromicrograph of F. psychrophilum x43000

Major objectives

To develop an effective vaccine for rainbow trout fry, fingerlings and broodstock against *F. psychrophilum* for the control of RTFS.

Subobjectives

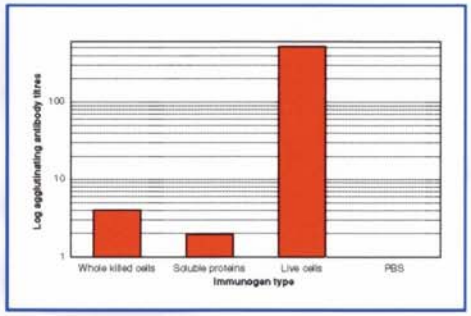
- To establish the role of cell mediated immunity (CMI) and to characterise the response of rainbow trout following immunisation, thus establishing the role that antibody plays in protection.

Fry tanks at one of the co-operating fish farms

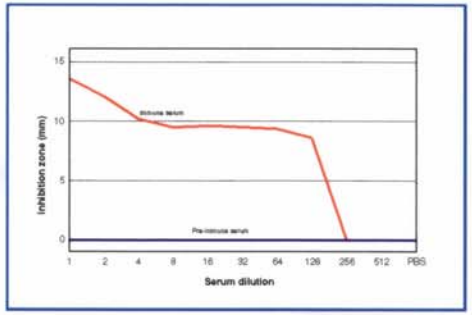
- To determine virulence factors of the bacteria, that may be used as candidate immunogens.
- To develop bacterins using different fermentation, harvest, and deactivation methods, and to assess the level of protection against RTFS produced by vaccination with these various preparations, using laboratory challenge models.
- To transfer candidate vaccines to small scale clinical field trials at co-operating fish farms in the UK

Progress Against Targets:

- Humoral responses in 30 g rainbow trout to immunisation with *Flavobacterium psychrophilum*.

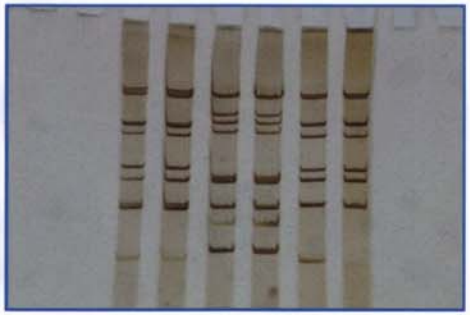


Agglutination titres of trout serum immunised with different preparations of F. psychrophilum



Bacteriostatic action of immune/pre-immune trout serum against F. psychrophilum

- The graphs show initial results of studies to examine the antibody response in adult rainbow trout to immunisation with adjuvanted (Freunds complete and incomplete adjuvant (FCA/FIA)) soluble proteins, dead and live cells.
- High titres (1/256) of antibody response have been demonstrated against live whole cells.
- Lower titres have been measured following immunisation with dead cells and soluble proteins.
- Serum inhibition assays have demonstrated considerable bacteristatic activity against *F. psychrophilum*.



Silver staining of SDS-Page electrophoresis gel to characterise the potential antigens of the bacterium.

Work in Progress:

- Western blotting is a widely used technique that enables molecules to be characterised electrophoretically and antigenically.
- Characterisation of antigens of *F. psychrophilum* is in progress using polyclonal rabbit and trout antisera.
- Localisation of immunogenic antigens of *F. psychrophilum* will help to ensure that future vaccines are developed that contain these protective antigens.

Industrial partners:

Veterpharm Ltd, Unit 15, Sandleheath Industrial Estate, Fordingbridge, Hampshire, SP6 1PA;
British Trout Association, 8/9 Lambton Place, London W11 2SH.

[1]The Centre for Enviroment, Fisheries and Aquaculture Science (CEFAS), Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset, DT4 8UB, UK http://www.cefas.co.uk
[2]Institute of Aquaculture, University of Stirling, Stirling, FK9 4LA

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science