



## Apresentações Internas do CIIMAR

Data: 21/03/2005

Horário: 14:00 – 15:00

Local: Auditório CIIMAR, Rua dos Bragas 289

Coordenador: Dr. Rodrigo Ozorio

### Programa:

**14:00 - 14:15 Ecophysiology of *Porphyra dioica* (Rhodophyta) in culture: a step towards integrated aquaculture systems.**

**Rui Pereira - Laboratório de Biodiversidade Costeira**

**14:20 - 14:35 Use of Cell Cultures to evaluate immunoestimulants for aquaculture**

**Camino Fierro – Laboratório de Imunobiologia**

**14:40 - 14:55 Muscle development in cultured blackspot seabream *Pagellus bogaraveo*: preliminary histochemical and immunohistochemical data on the fibre types.**

**Paula Silva – Laboratório de Estudos Celulares e Moleculares / Laboratório de Nutrição, Crescimento e Qualidade de Peixes**

### Resumos:

Ecophysiology of *Porphyra dioica* (Rhodophyta) in culture: a step towards integrated aquaculture systems.

**Rui Pereira - Laboratório de Biodiversidade Costeira**

The genus *Porphyra* is one of the most important seaweeds in aquaculture, both in value and biomass. According with FAO, 1.132 million metric tons of *Porphyra* were produced in 2001, valued at 1.2 billion USD. Production of *Porphyra* represents 16.3% of the world's seaweed mariculture, which in turn corresponds to 28.4% of the world's total mariculture production including fish, aquatic plants, molluscs and crustaceans. *Porphyra* is mainly used for human consumption and as source of the red pigment r-phycoerythrin. This study was thought to increase the knowledge of the biology of *Porphyra dioica*, one of the most common *Porphyra* species in the North of Portugal. The essential objectives were: to characterize the life cycle of the species, both in the field and in the laboratory; to determine the optimal conditions for the growth of the gametophytes and to assess its potential for use in integrated aquaculture. Maximum growth rates,

33% fresh weight (fw) per day, were recorded with 0.1 g fw l<sup>-1</sup> stocking density, at 150 and 250 μmol photons m<sup>-2</sup> s<sup>-1</sup>. The maximum N removal, 1.67 mg N day<sup>-1</sup>, was recorded at 150 μmol photons m<sup>-2</sup> s<sup>-1</sup>, with 1.5 g fw l<sup>-1</sup> stocking density. *Porphyra dioica* was able to grow equally well using NO<sub>3</sub><sup>-</sup> or NH<sub>4</sub><sup>+</sup> as source of N. The results obtained during this work showed that *Porphyra dioica* is a good candidate for application in integrated aquaculture systems. Evidences for this are: high growth rates, achieved over a range of temperatures and photoperiods; ability to uptake and accumulate high amounts of N, under high concentrations and at least in two different forms (NO<sub>3</sub><sup>-</sup> and NH<sub>4</sub><sup>+</sup>); possibility of vegetative propagation of the blades. Application of this species will depend on ongoing studies on large scale systems and assessment of the quality/value of its biomass.

**Keywords** : Porphyra, Porphyra dioica, integrated aquaculture, N uptake

## Use of Cell Cultures to evaluate immunoestimulants for aquaculture

### Camino Fierro – Laboratório de Imunobiologia

This project involves a study on the usefulness of previously developed cell and tissue culture systems from rainbow trout lymphoid and non-lymphoid organs to obtain a cost-effective and safe method for the selection of immunostimulants for aquaculture. Immunostimulants may enhance non-specific immunity, thus producing protection against several unrelated fish diseases, and do not have the potential hazards and side-effects of other antimicrobial drugs. However, the selection of new substances as immunostimulants is a laborious work, especially in fish due to their high variability of individual responses of ectothermic animals. The use of cell culture methods and in vitro assays is a cost-effective alternative to in vivo experimentation, as they allow higher control of experimental conditions and may help to dissect the mechanisms underlying the biological responses to the immune modifiers. The project will focus on the in vitro assessment of the effects of several immunostimulants, as Levamisole and polynucleotides, on the lymphoid and non-lymphoid cell cultures. The protective effects against *Aeromonas hydrophila* and *Renibacterium salmoninarum* will be evaluated in comparison to the elicitation of cytokines in vitro. The objectives include the analysis of the effect of the immunostimulants as inducers of macrophage and granulocyte activating cytokines (MAF and MIF), of interferon, and of TNF, as well as of oxidative microbicidal products.

**Keywords** : Cytokines, immunostimulants, macrophages, Tumor necrosis factor, respiratory burst, fish

Muscle development in cultured blackspot seabream *Pagellus bogaraveo*: preliminary histochemical and immunohistochemical data on the fibre types.

**Paula Silva – Laboratório de Estudos Celulares e Moleculares / Laboratório de Nutrição, Crescimento e Qualidade de Peixes.**

We are studying muscle ontogeny and fibre type characteristics in the blackspot seabream, which is a new species for commercial aquaculture. Myosin ATPase and SDH histochemistry and immunohistochemistry with a panel of antibodies to myosin isoforms and parvalbumin were tested at different ontogenetic stages. In general, deep white muscle was parvalbumin-positive, and superficial 'red' muscle was parvalbumin-negative at all ages examined. At 6 days of age (transition from endogenous to exogenous feeding) three layers of muscle fibres were observed with different antimyosin reactivities: superficial monolayer, presumptive slow red (present only as a small group of fibres adjacent to the lateral line nerve), and presumptive fast-white (forming the bulk of the muscle). The superficial monolayer and presumptive slow fibres were positive for SDH. At 60 days of age (transition from live to artificial feeding) an additional fibre type was identified: a typical 'pink' or intermediate layer. In juveniles, the axial muscle consisted mainly of fast white fibres covered by a slow-red layer and between them a pink layer. Surprisingly, the red layer could be resolved into 2 distinct types by myosin immunostaining. Red fibres were also present along the horizontal septum, near the notochord. Both red and white muscle layers showed a mosaic appearance, which was confirmed by ATPase reaction.

**Keywords :** Histochemistry; Immunohistochemistry; Blackspot seabream; Muscle Growth; Muscle Hyperplasia; Muscle Hypertrophy.

**Publication:** ROWLERSON, A.M.<sup>1</sup>, SILVA, P.<sup>2</sup>, ROCHA, E.<sup>2,3</sup>, OLMEDO, M.<sup>4</sup> AND VALENTE, L.M.P.<sup>2,3</sup>. 2003. Muscle development in cultured blackspot seabream *Pagellus bogaraveo*: preliminary histochemical and immunohistochemical data on the fibre types. *Arch. Tierz., Dummerstorf* **46**, Special Issue, 172

<sup>1</sup>School of Biomedical Sciences, King's College, University of London, UK.<sup>2</sup>ICBAS – Institute of Biomedical Sciences Abel Salazar, University of Porto Portugal. <sup>3</sup>CIIMAR – Center for Marine and Environmental Research, Porto, Portugal. <sup>4</sup>Instituto Español de Oceanografía, Cabo Estay, Vigo, España.