

# ECONOMICAL IMPACT OF ROTIFER CULTURE PROBLEMS IN A HATCHERY



*Larvi'05*



## *What is the cost structure in a marine hatchery ?*

### **Producing in a hatchery is:**

- 40% Labour
- 14% Investment
- 8.5%Energy

*Source of following table: PROFET 2004 Bordeaux, D. Leclercq*





**Batch or semi-continuous tank culture, extensive method**





Classical semi-continuous  
cultivation tank



University scaled high density continuous rotifer culture system (*UNCW*)



## ***WHAT'S THE WEIGHT OF THE ROTIFER SECTION INVESTMENT OVER TOTAL INVESTMENT?***

- As a percentage of the total surface in a hatchery the rotifer section may represent from 3 to 6% of total surface.
- It is usually low in technical equipment and beneficiate from infrastructures existing for other tasks in the hatchery (boilers, air pressure, filtered water, lab...)
- Parameters in the room and in the tank are usually under less intensive control than other items in a hatchery.

***We estimate that less than 3% of the total investment is done for rotifer culture specific purpose !!***



## *WHAT'S THE WEIGHT OF THE ROTIFER SECTION INTO THE OPERATIONAL COSTS ?*

- **As a percentage of the labour incurred in the hatchery, it's only 5 to 10% of the total production labour cost, incl. the strains maintenance, enrichment and so on.**
- **Energy wise, the volume of water to be heated is low compared to artemia culture, larval rearing, and pre growing. It requires low volume of air/oxygen per cubic meter of culture. It has low water renewal rhythm. Meaning that rotifer culture, as practiced in most cases, doesn't weigh more than 1 or 2% of the energy costs incurred in a hatchery.**
- **Feed which is used can be phytoplankton, algal paste, fresh yeast, dry yeast, compound feed. What ever the choice, hatchery manager find it extremely costly per kilogram. However, rotifer diet (at the exception of live phytoplankton) doesn't cost much RELATIVELY to total feed cost in a hatchery. They account for less than enrichments or dry larval feed in that section.**



<i>COST SECTION</i>	SECTION COST OVER TOTAL PROD. COST	RELATIVE ROTIFERE COST IN SECTION
LABOUR	40%	8%
DEPRECIATION	14%	3%
ENERGY	8.5%	2%

***We estimate that less than 4% of the total production cost of a juvenile is related to rotifer culture task***



## *Effects of a rotifer culture crash*

**Whatever the hatchery, we are a lot having experienced rotifer culture crash.**

**Sometimes, a couple of time in a year, some time during a whole potential production cycle.**

**It affects:**

**The quality of the enrichment**

**The quantity of available rotifers**

**The availability of workers for other tasks**

**The expenditures for potential replacement diets**

**The preparation of the larvae to artemia transition**

**The survival of the fish larvae through the rotifer phase**

**The survival of the larvae through further steps of the process**



## ***WHAT TYPE OF LOSSES?***

- **ONE FULL CYCLE OVER 5 OR 6 CYCLES**
- **A 20% REDUCED SURVIVAL AS A CHRONICAL EFFECT OF LIMITED SUPPLY?**
- **A RELATIVE INCREASE OF ALL OTHER FIXED COSTS ON THE PRODUCED FISH DUE TO LOWER YIELDS?**

*IT IS DIFFICULT TO QUOTE PRECISELY THE LOSSES DUE TO UNSTABILITY OF ROTIFER CULTURE, BUT WE ASSUME THAT A 20% LOSS OF THE ANNUAL POTENTIAL PROFIT CAN BE A GOOD ESTIMATE.*



# *WHAT CAN BE DONE TO AVOID CULTURE CRASHES OR REDUCE THEIR EFFECTS?*

WORK ON THE LABOUR SIDE TO LIMIT VARIABILITY OF THE PROCESS:

- AUTOMATION OF THE CULTURE PROCESS
- FEEDING PUMPS
- ACURATE EQUIPMENT TO CONTROL FLUIDS FLOWS
- AUTOMATION OF COUNTING (ADAPTED SOFTWARE)
- TRANSFER PUMPS
- BETTER TOOLS FOR GROWTH PREDICTION OR CULTURE DEVELOPMENT PREDICTION (ADAPTED SOFTWARE)



# *WHAT CAN BE DONE TO AVOID CULTURE CRASHES OR REDUCE THEIR EFFECTS?*

WORK ON THE INVESTMENT SIDE TO OPTIMIZE THE PROCESS AND ITS ENVIRONMENT:

- IMPROVE THE CULTURE ROOMS (INSULATION, VENTILATION, HYGIENIC CONTROL, THERMAL CONTROL OF THE CULTURE MEDIUM...)
- STANDARD TANKS OR CULTURE SYSTEM
- AUTOMATION OF FEED AND AIR/O<sub>2</sub> DISTRIBUTION
- AUTOMATION OF POPULATION ESTIMATES TO IMPROVE FEEDING ADJUSTMENTS



# *WHAT CAN BE DONE TO AVOID CULTURE CRASHES OR REDUCE THEIR EFFECTS?*

WORK ON THE INPUTS TO OPTIMIZE THE PROCESS AND ITS STABILITY:

- WHY IS PHYTOPLANKTON STILL NECESSARY IN MOST CASES?
- WHY ARE COMPOUND DIETS DIFFICULT TO DOSE?
- WHY IS WATER SPOILED WITH HIGH CONTENTS OF DISSOLVED ORGANIC MATERIAL?
- WHY DO WE ACCEPT TO RUN ROTIFER CULTURE IN A WATER QUALITY THAT WE WOULDN'T DARE TO OFFER TO LARVAE?



# *WHAT CAN BE DONE TO AVOID CULTURE CRASHES OR REDUCE THEIR EFFECTS?*

WORK ON HYGIENIC CONDITIONS TO OPTIMIZE THE PROCESS AND ITS STABILITY:

- INOCULUM OF THE CULTURE SHOULD BE CLEAN AND SAFE
- WATER TO BE TREATED AT AN ACCEPTABLE LEVEL
- OTHER FLUIDS AS WELL (O<sub>2</sub>, AIR)
- FEED SOURCE HAS TO BE SAFE TOO

*Do we work as clean as in a biotechnological factory?*

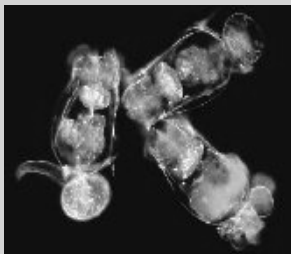


WHAT WE ARE FACING IS A HATCHERY  
TASK THAT ACCOUNTS FOR LESS  
THAN

3% OF THE INVESTMENT

4% OF TOTAL PRODUCTION COST

AND POTENTIALY INDUCES AROUND  
20% PROFIT LOSSES



*Larvi'05*

