Maricoltura di Rosignano Solvay

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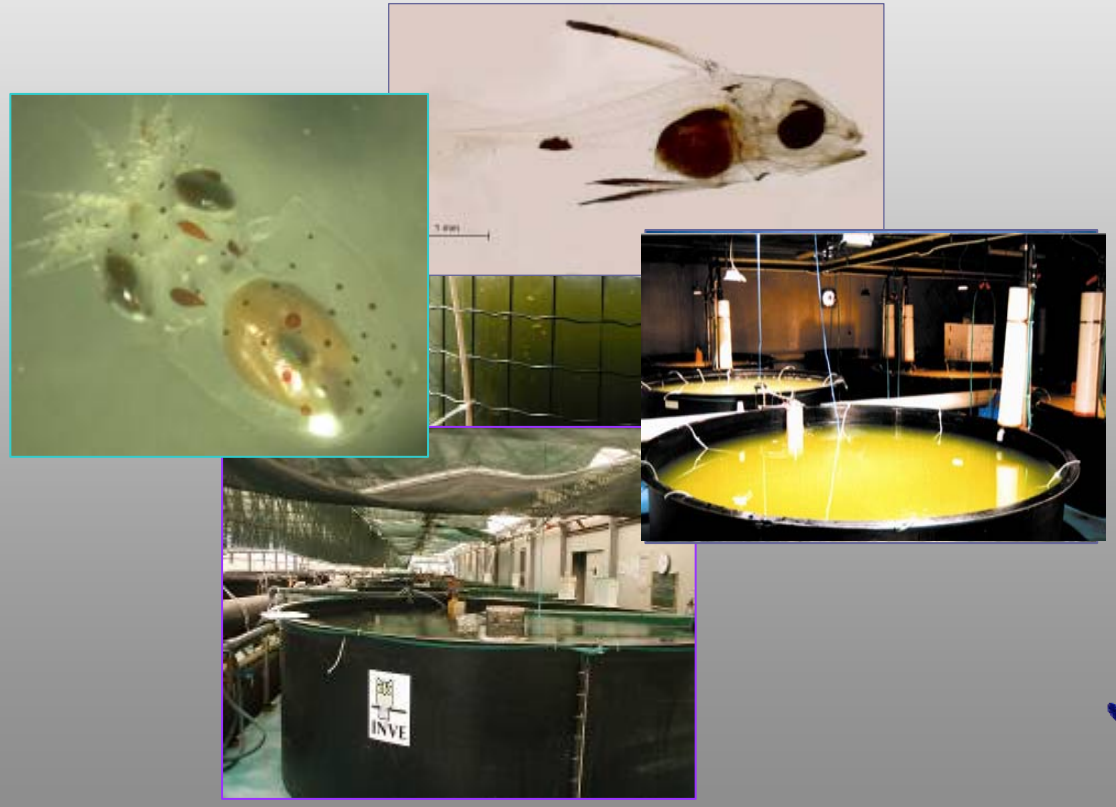

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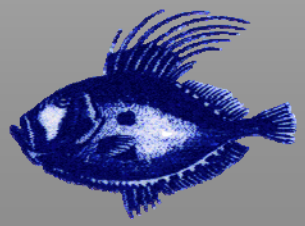
Performance and culture stability of intensive rotifer production on commercial scale: a 2-years case study

V. Courtens and T. De Wolf

LARVI ’05, ROTIFER WORKSHOP

Ghent, 9 september ‘05



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MARICOLTURA di ROSIGNANO SOLVAY (MRS) is a modern medium size hatchery located in Tuscany close to Livorno 120 Km from Firenze

The farm has been build in 1995 and has a total surface of 11 000 m^2 with an annual capacity of around 2-3million fry

General view of the 1300 m^2 buildings,
100 meters far from the sea

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Main species:

Gilthead Seabream

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Production diagram for gilthead seabream

Nursery
18-20°C sal 38ppt
pH7.5-8
Only artificial feeds
Tanks 20mt

Weaning
T° 20°C sal 38ppt pH7.5-8
Cofeeding Artemia /artificial feeds
Tanks 10mt

Larval rearing
18-20°C sal 38 ppt pH 7.5-8
Feed: Rotifers/Artemia
Tanks 6mt

Broodstock
Photoperiod - Temperature
Spawning sector
Egg collection

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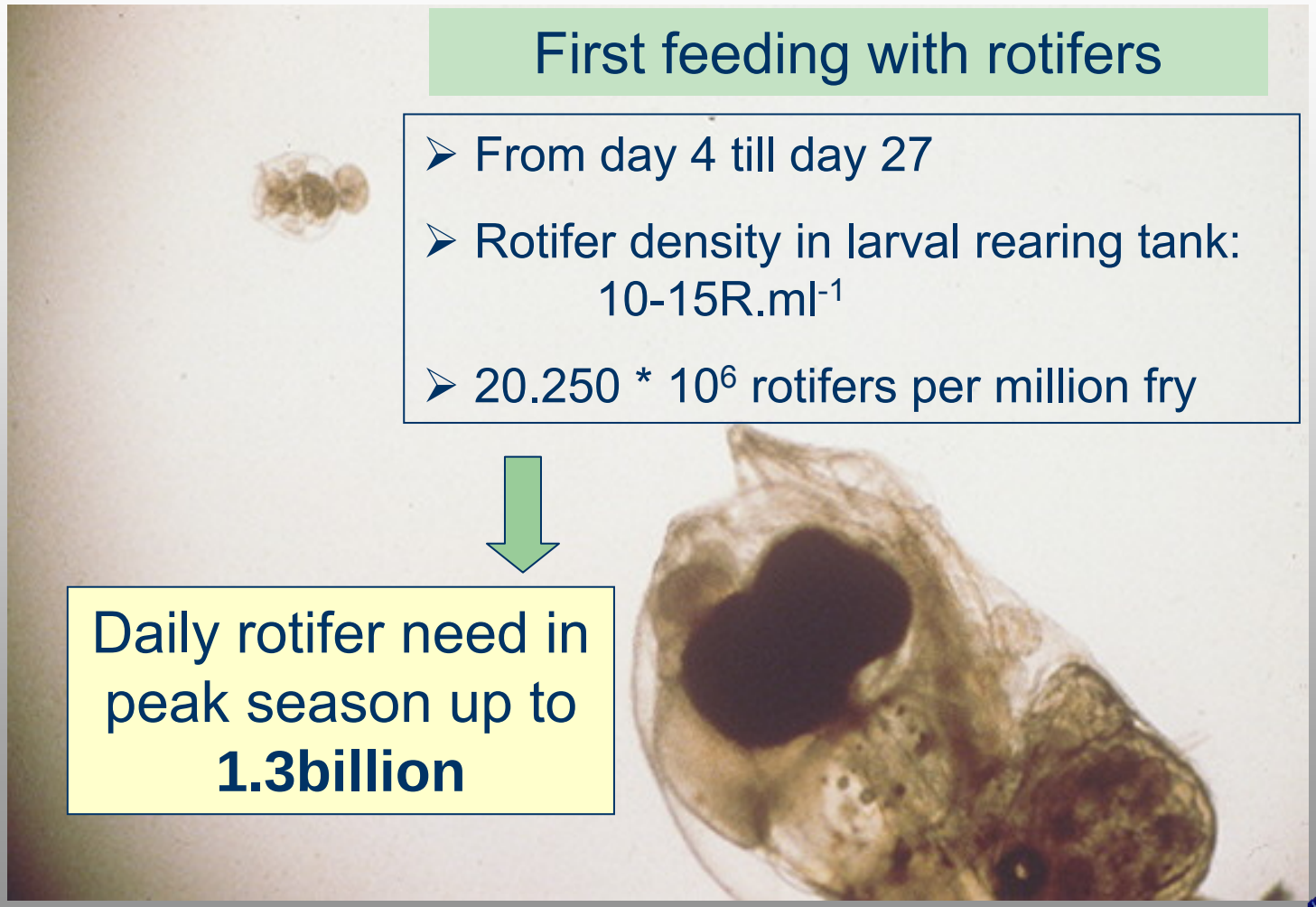
First feeding with rotifers

- From day 4 till day 27
- Rotifer density in larval rearing tank: 10-15R.ml^{-1}
- 20.250 * 10^{6} rotifers per million fry

Daily rotifer need in peak season up to **1.3billion**



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Typical rotifer production method

-**Stock culture** of rotifer strains in test tubes under thermo-regulated conditions (19°C; 25ppt)

-**Upscaling** from stock cultures to starter cultures in *Nannochloropsis sp.*

- Inoculation of 10 liter flask in 100 liter tank. Start **co-feeding** with CS Plus ®. (25°C; 25ppt; DO 7ppm)

- **Mass culture** in batch on CS Plus ® (25°C; 25ppt; DO 7ppm)

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Mass culture in batch system

- Eight 1000L tanks
- Cycles of 3 days
- After start-up on algae, all batches on dry feed CSPlus®

Average production capacity of over **3 billion rotifers** per day

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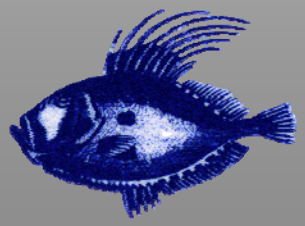
Advantages of this batch system:

- Limited risks
- Predictability of daily quantity of harvest
- Standard procedure system
- Limited work load



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Follow up of total of **112** batch cultures during production season

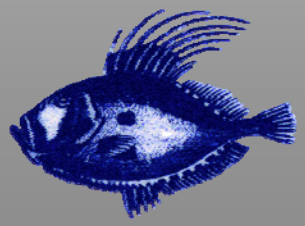
- Strains:

  MRS: Local, native strain (biotype Cayman)

  GBA: USA, Portsmouth (biotype Austria)

- Average life span: 4 – 28 cycles
(continuous renew of older cycles by younger and more healthy populations)

- Every 3rd day (day of harvest): sampling for genetic analyses



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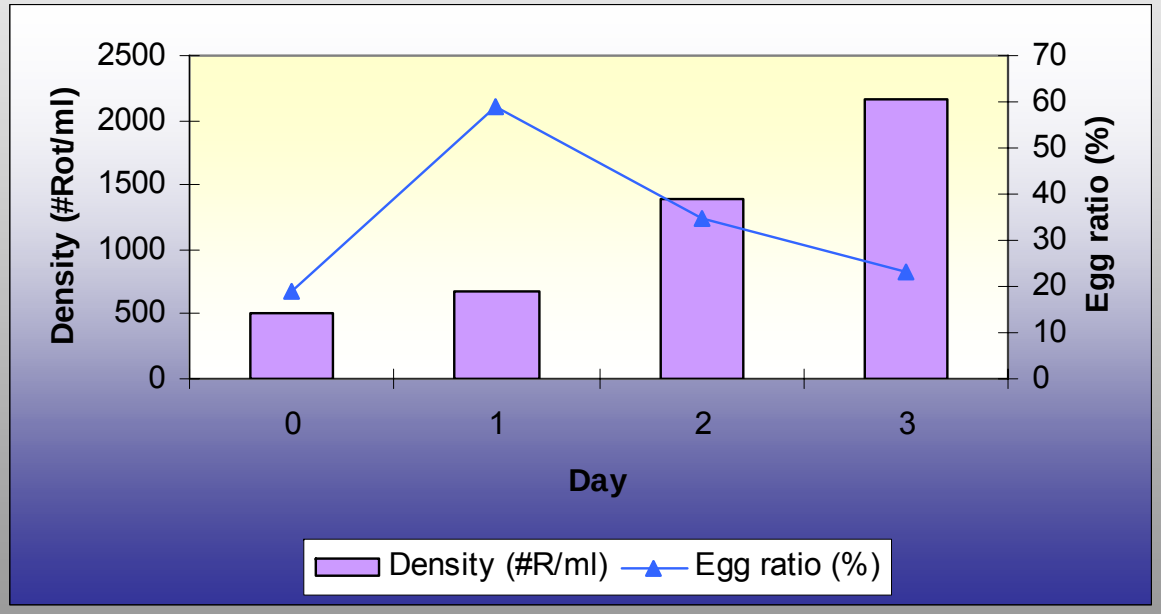
RESULTS

Average growth



- End density: >2000Rot.ml^{-1}
- FC: 0.70 g.mill^{-1}
- SGR: 45%.day^{-1}

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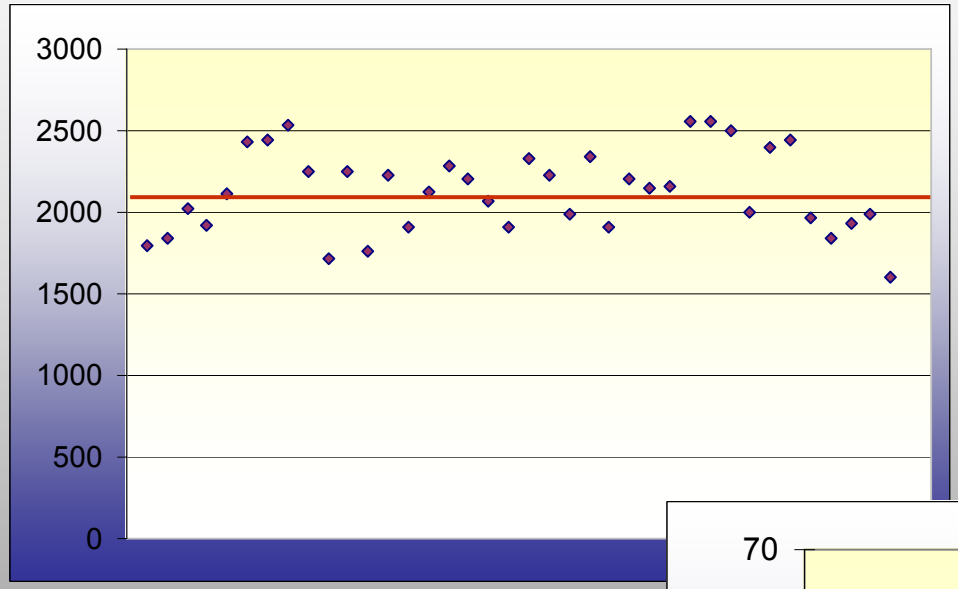
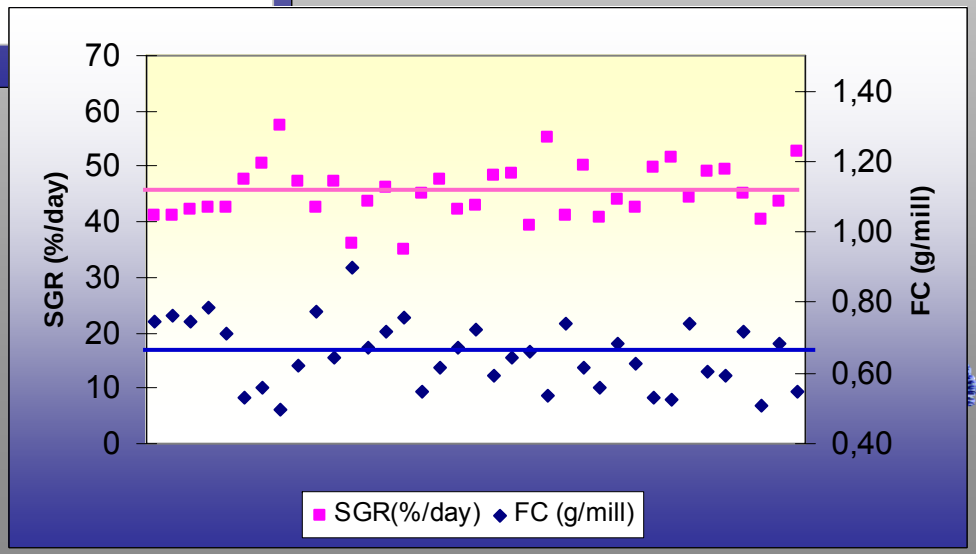
Stability of the performance of all medium density cultures



- End density: (2129±254)R.ml^{-1}
- SGR: (45±5)%
- FC: (0.65±0.09)g.mill^{-1}

Predictable and stable harvest



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Crashes:

Worse overall conditions in the rotifer room

Genetic drift

2 out of 112 batches:

Complete loss of eggs

CRASHED

Problematic starter cultures:

- bad quality algae
- difficult transition algae ➔ artificial feed

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Genetic analyses of rotifer samples

- **Cayman biotype** is dominant in the complete series of hatchery samples
- Dominant biotype not influenced by:
  - Type of feed
  - Crashes

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Competition MRS - GBA

- Biotype **Cayman**
- Origin: **native strain!**
- Lorica length: 144µm – width: 103µm
- Optimal culture conditions: 23-25°C; 25ppt

- Biotype **Austria**
- Origin: USA, Portsmouth
- Lorica length: 250µm – width: 180µm
- Optimal culture conditions: 26-28°C; 26ppt

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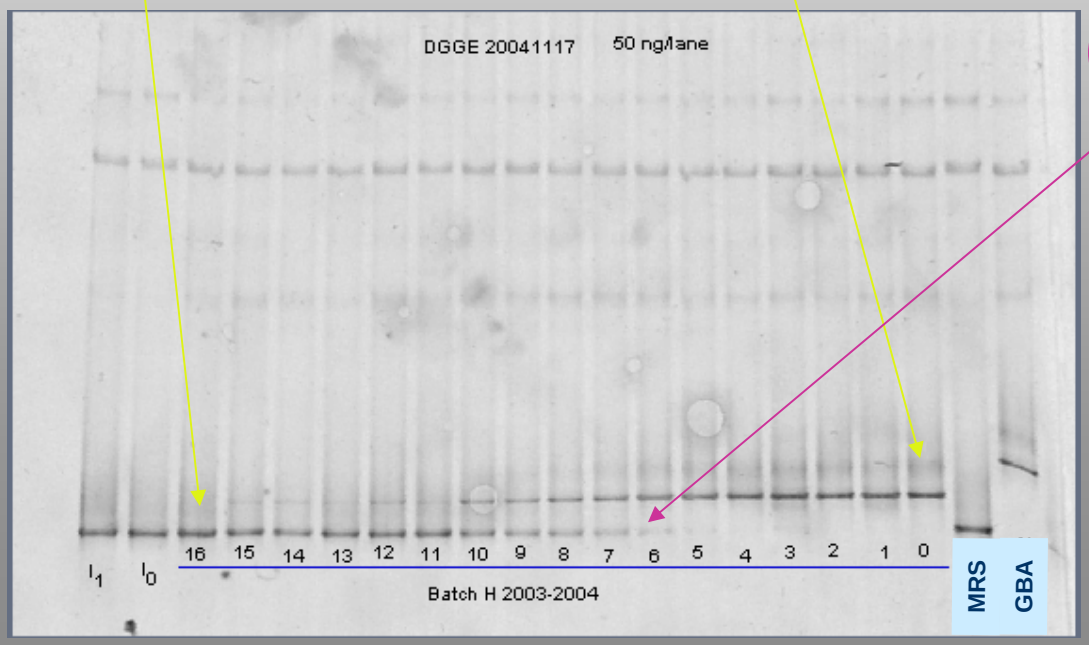
End up with:

100% Cayman biotype rotifers

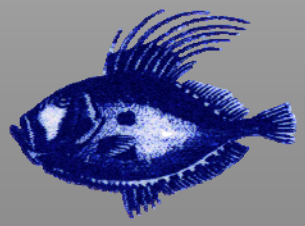
Start new batch:

100% Austria biotype rotifers



Spontaneous "contamination" with the local, native strain

from 6th cycle onwards



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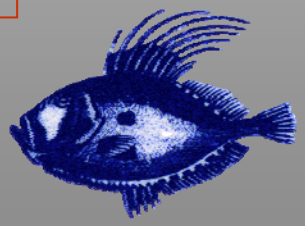
Rotifer populations in hatcheries tend to contain a **single biotype**

The rotifer strain with the best growth kinetics and the most adapted to local conditions is completely taking over

COMPETITION

“ Survival of the fittest”



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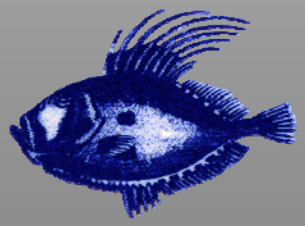
CONCLUSIONS

- **No** genetic alteration correlated with the accidental crashes that are occurring in the rotifer production on large scale

- The stability of the results, following up a great number of batch cultures, suggest that under optimal culture conditions, it is possible to establish a **stable rotifer production**



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Thank You