



SEACASE International Workshop 20 - 21 January 2010 Tavira

# Mesocosms as nurseries for rearing gilthead seabream (*Sparus aurata*) and sole (*Solea senegalensis*): SEACASE trials in Portugal

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*This study has been carried out with the financial support from the Commission of the European Communities,  
specific RTD programme "Specific Support to Policies",*

*SSP-2005-44483 "SEACASE - Sustainable extensive and semi-intensive coastal aquaculture in Southern Europe",  
and does not necessarily reflect the European Commission views and  
in no way anticipates the Commission's future policy in this area.*

# Mesocosm as a tool for fish larval rearing

CIHEAM - Options Mediterraneennes

## Hatchery techniques for specific diversification in Mediterranean finfish larviculture

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**SUMMARY** – After a very early research stage in the 70's, and a predevelopment stage in the 80's, the Mediterranean finfish mariculture (mainly sea bass sea bream) has boomed in the 90's, reaching about 70,000 t of marketable size fish and 300 million fry in 1997. The main reason for this success was the progress and diversification in hatchery techniques. All based on the use of live prey, these techniques are divided into several categories according to larval density, (intensive, mesocosms and extensive), the quality of the rearing medium (clear water, green water, pseudo green water) and some other criteria. Although perfectible, these techniques are actually quite satisfactory for species diversification in many fields of larviculture, but their choice has to be well documented. In this article, the authors review the conditions of this challenge.

**Key words:** Mediterranean aquaculture, larval rearing, hatchery techniques.

# Trials to understand mesocosms capabilities

## Trials

## Date

## Main question



April to June,  
2007

Will they survive?!



May to July,  
2007

What larval density to use?



June to August,  
2007

Let's give them more food!!!





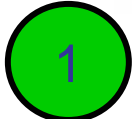






April to June,  
2009









Let's try with this guys!!!

# Experimental design

# Experimental design: Mesocosm

<u>Trials</u>	<u>Water source</u>	<u>Tanks (m<sup>3</sup>)</u>	<u>Larval density (#.L<sup>-1</sup>)</u>
	Growout Earthen pond filtered 500 µm	1 X 	4
	Mesocosm Earthen pond filtered 500 µm	6 X  6 X 	1.7 5.1
	Reservoir filtered 500 µm	3 X 	5
	Reservoir filtered 500 µm	3 X 	2

# Experimental design: Intensive

<u>Trials</u>	<u>Water source</u>	<u>Tanks (m<sup>3</sup>)</u>	<u>Larval density (#.L<sup>-1</sup>)</u>
	Reservoir, filtered and sterilized	→ 1 X 	20
	Reservoir, filtered and sterilized	→ 1 X 	60
	Reservoir, filtered and sterilized	→ 1 X 	30
	Reservoir, filtered and sterilized	→ 1 X 	20

# Zootechnical conditions



# Mesocosms: Seabream trials

Dry feed (Lucky Star®)

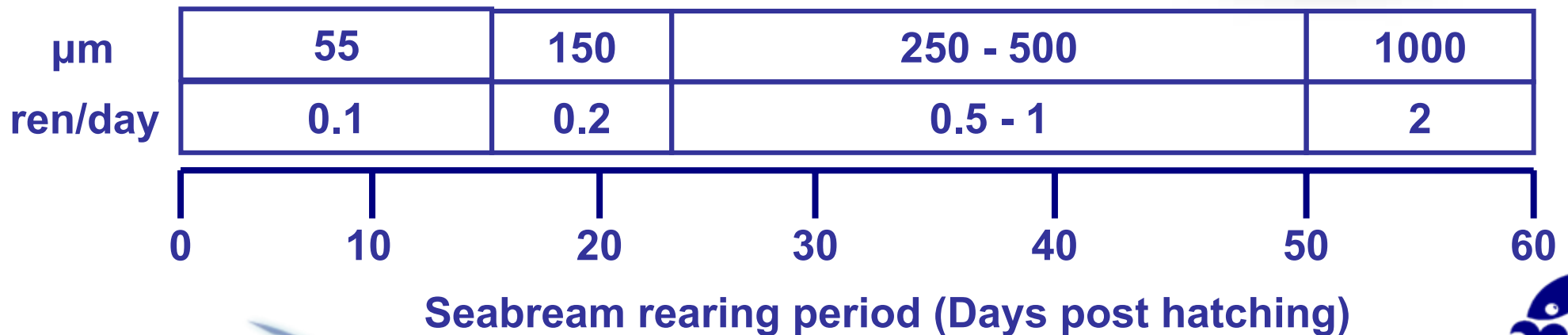
Artemia EG (0.03 - 0.15 art.mL<sup>-1</sup>)

Artemia AF (0.01 - 0.05 art.mL<sup>-1</sup>)

Rotifers (0.5 - 2 rot.mL<sup>-1</sup>)

Live algae (20 L.day<sup>-1</sup>)

**Only for trial 3**





# Intensive: Seabream trials

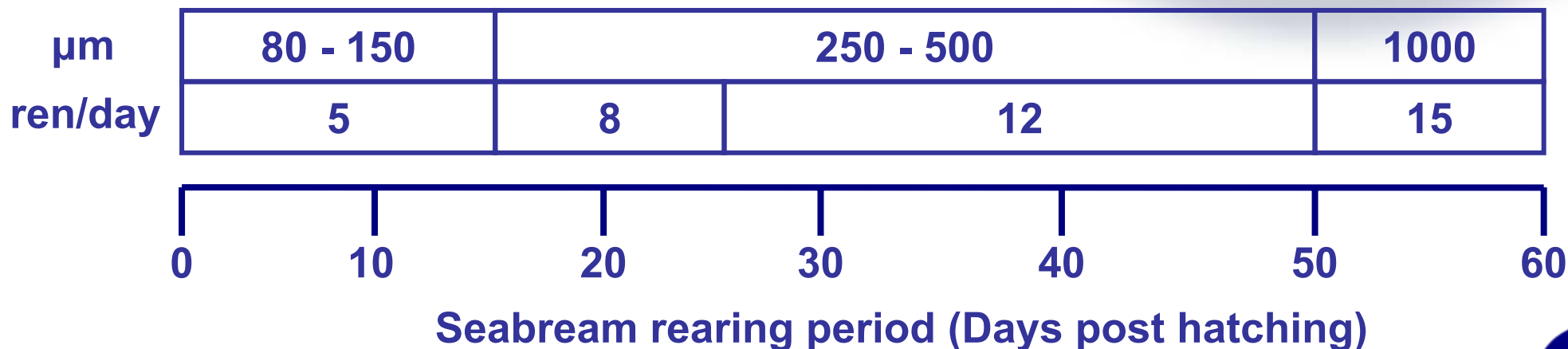
Dry feed (Lucky Star®)

Artemia EG (0.3 - 1.5 art.mL<sup>-1</sup>)

Artemia AF (0.1 - 0.5 art.mL<sup>-1</sup>)

Rotifers (5 - 20 rot.mL<sup>-1</sup>)

Live algae (20 L.day<sup>-1</sup>)





# Mesocosms: Sole trial

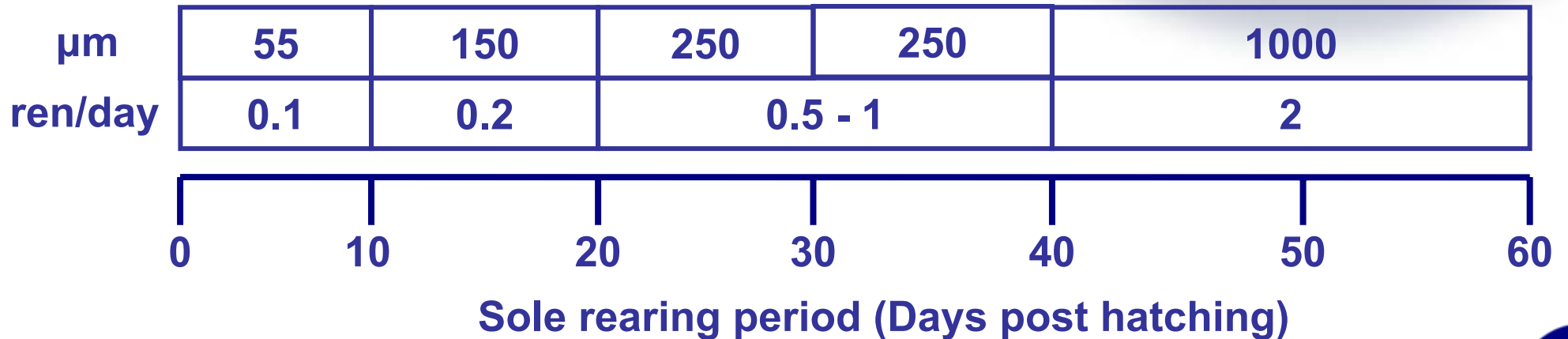
Dry pellets

Semi – humid pellets

Artemia EG frozen (0.1 – 0.3 art.mL<sup>-1</sup>)

Artemia EG Live (0.04 – 0.4 art.mL<sup>-1</sup>)

Live algae (20 L.day<sup>-1</sup>)





# Intensive: Sole trial

Dry pellets

Semi – humid pellets

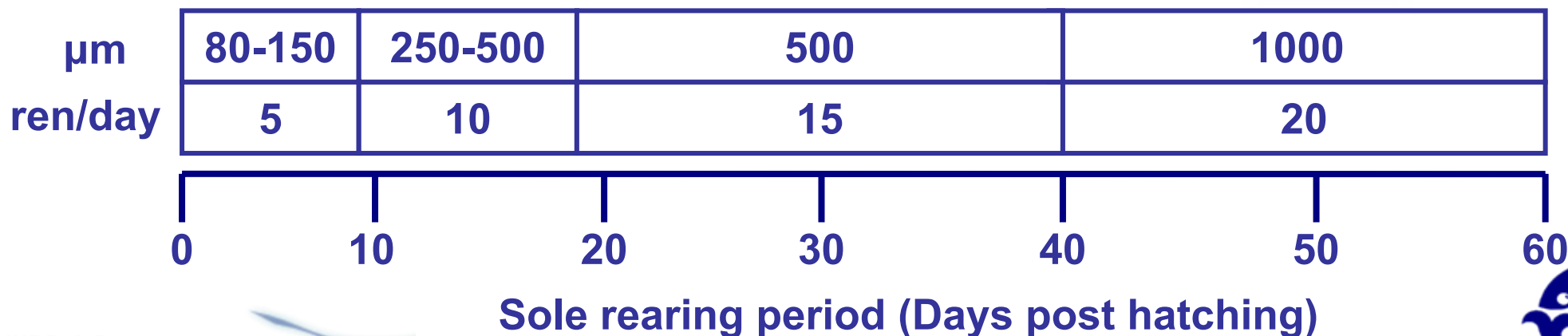
Artemia EG frozen (0.7 – 7 art.mL<sup>-1</sup>)

Artemia EG Live (0.1 – 7 art.mL<sup>-1</sup>)

Artemia AF Live (0.03 – 0.6 art.mL<sup>-1</sup>)

Rotifers (5 - 20 rot.mL<sup>-1</sup>)

Live algae (20 L.day<sup>-1</sup>)

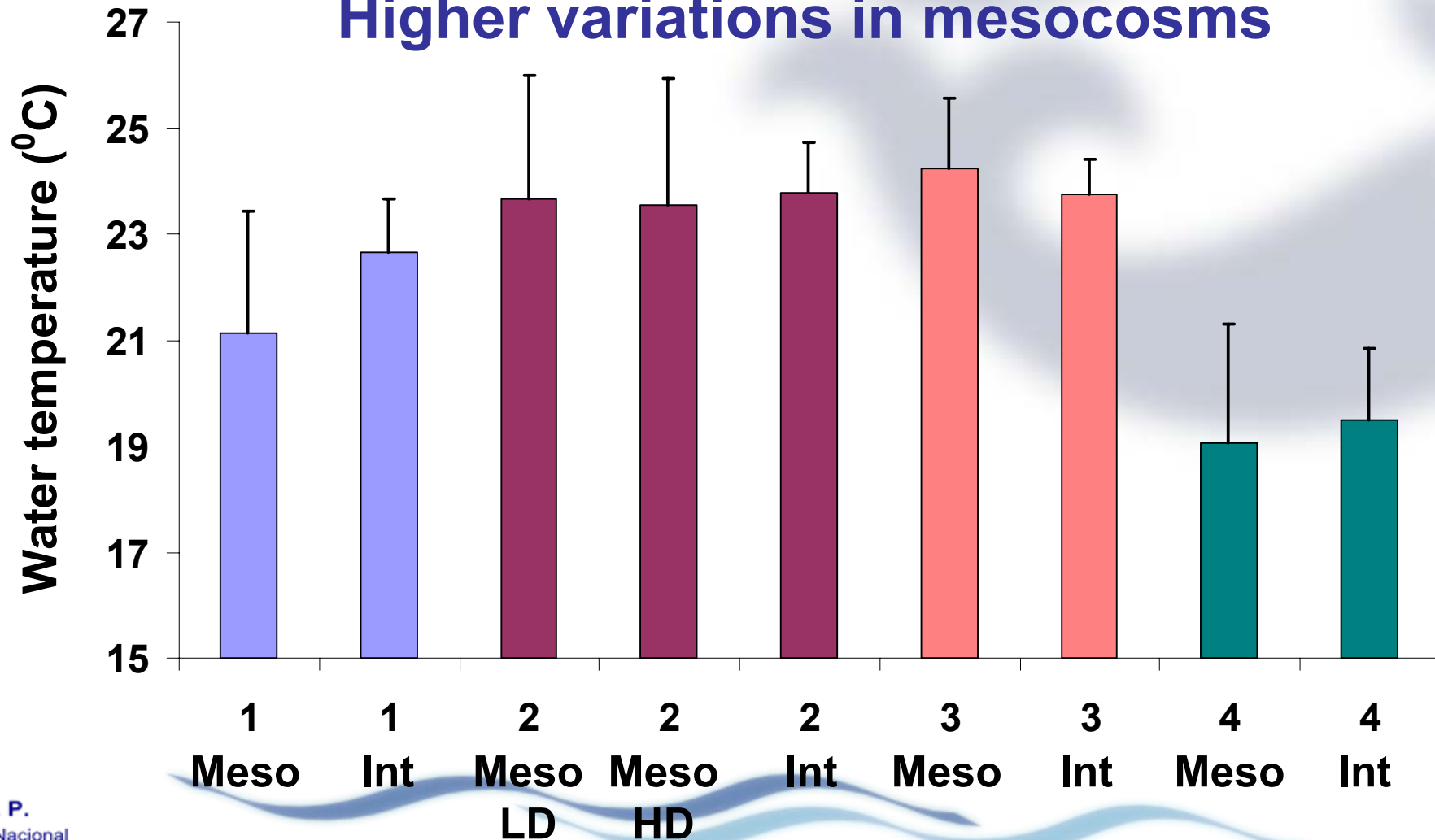


# Results

# Results: Water temperature

## Temperatures for all trials

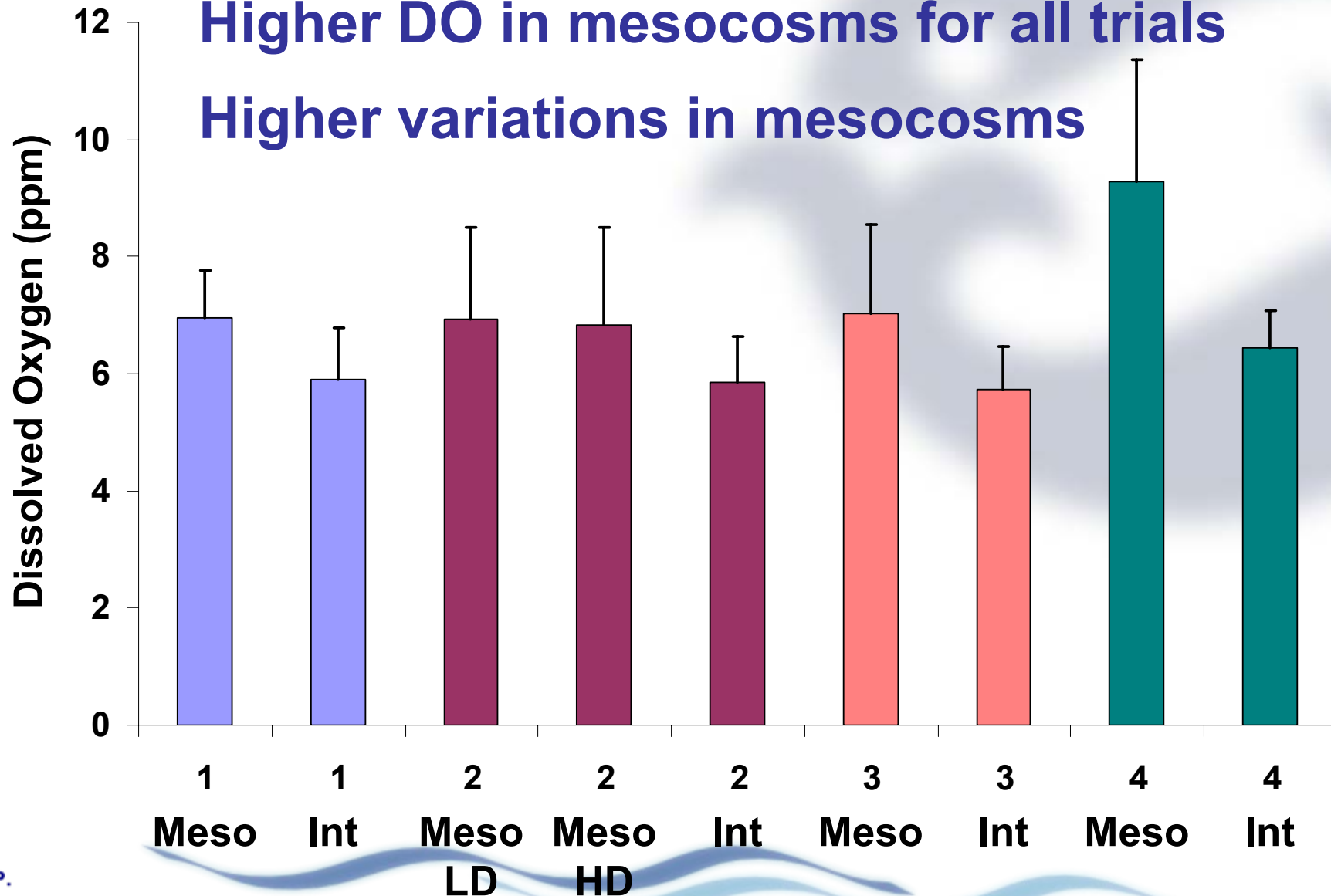
Higher variations in mesocosms



# Results: Dissolved oxygen

Higher DO in mesocosms for all trials

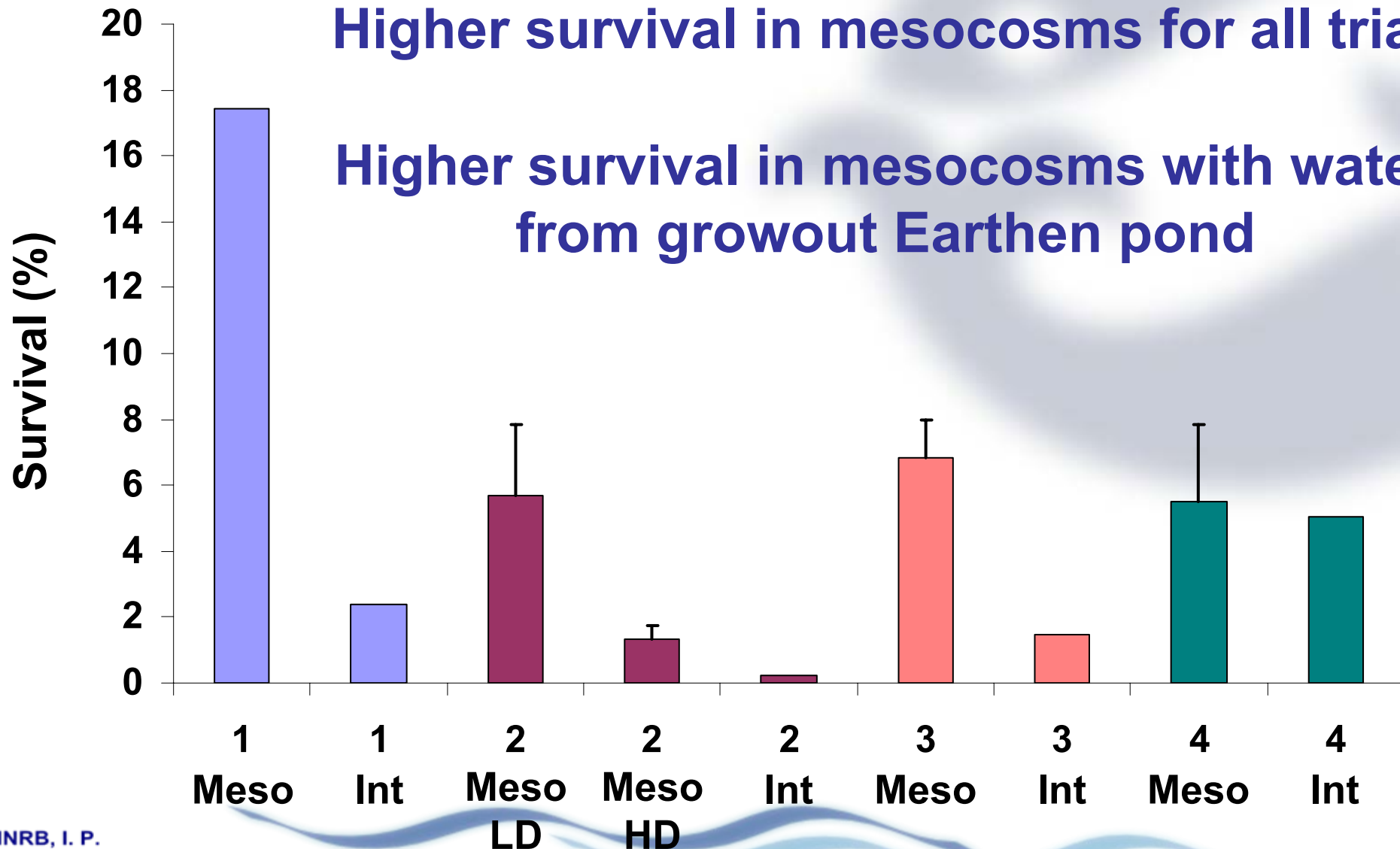
Higher variations in mesocosms



# Results: Survival

Higher survival in mesocosms for all trials

Higher survival in mesocosms with water from growout Earthen pond

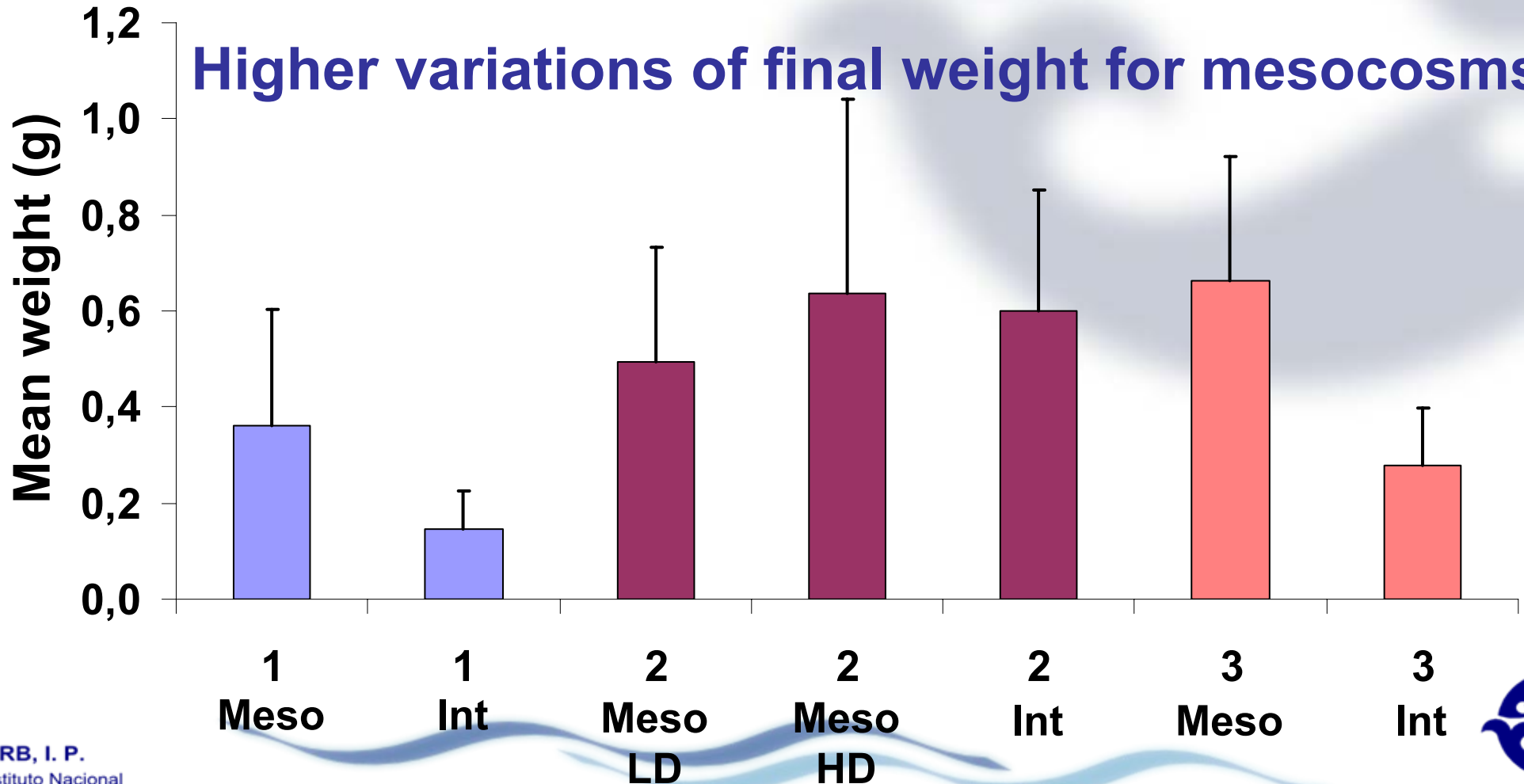


# Results: Final weight



Higher mean weight for mesocosms with water from growout E.P. and external feeding

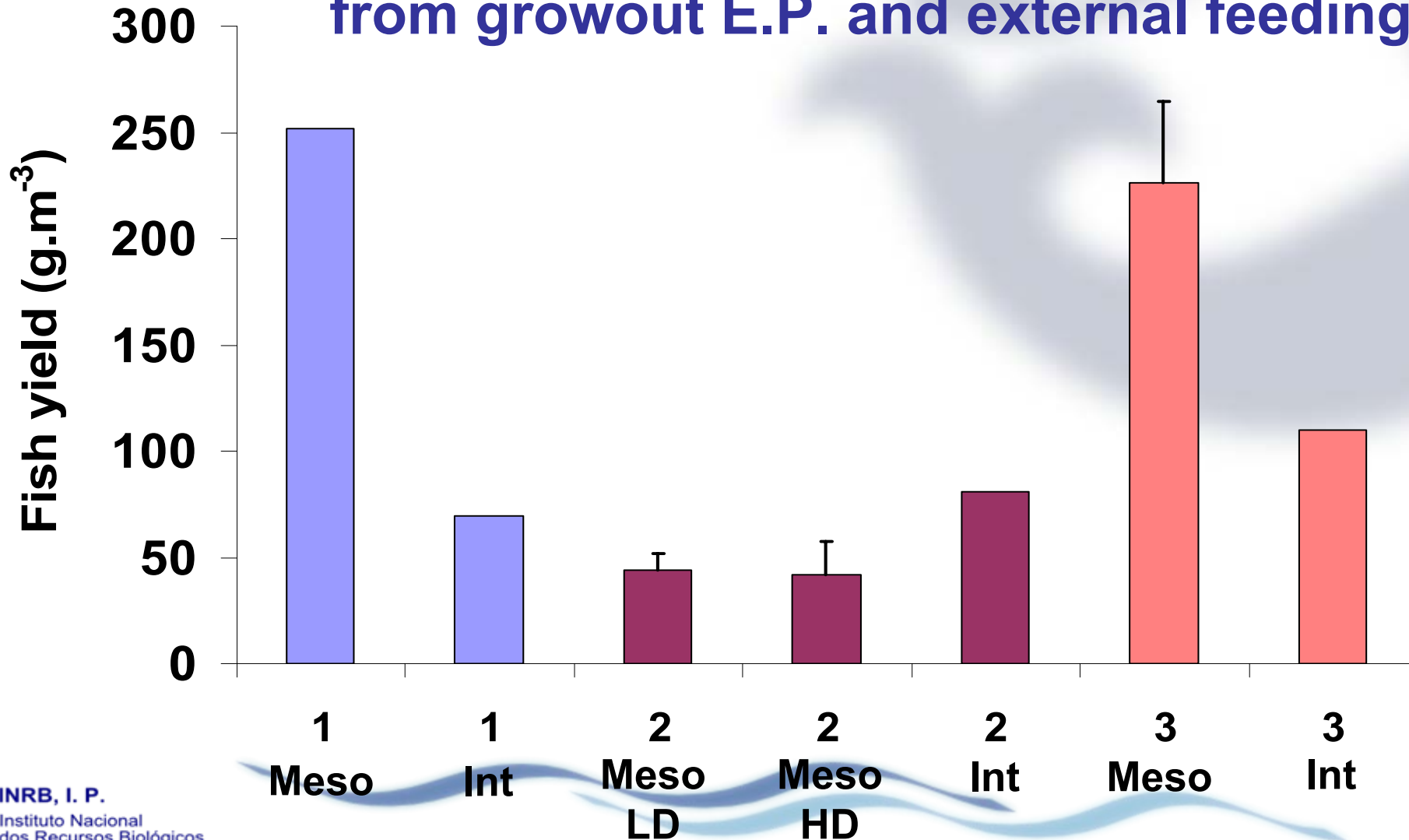
Higher variations of final weight for mesocosms



# Results: Fish yield



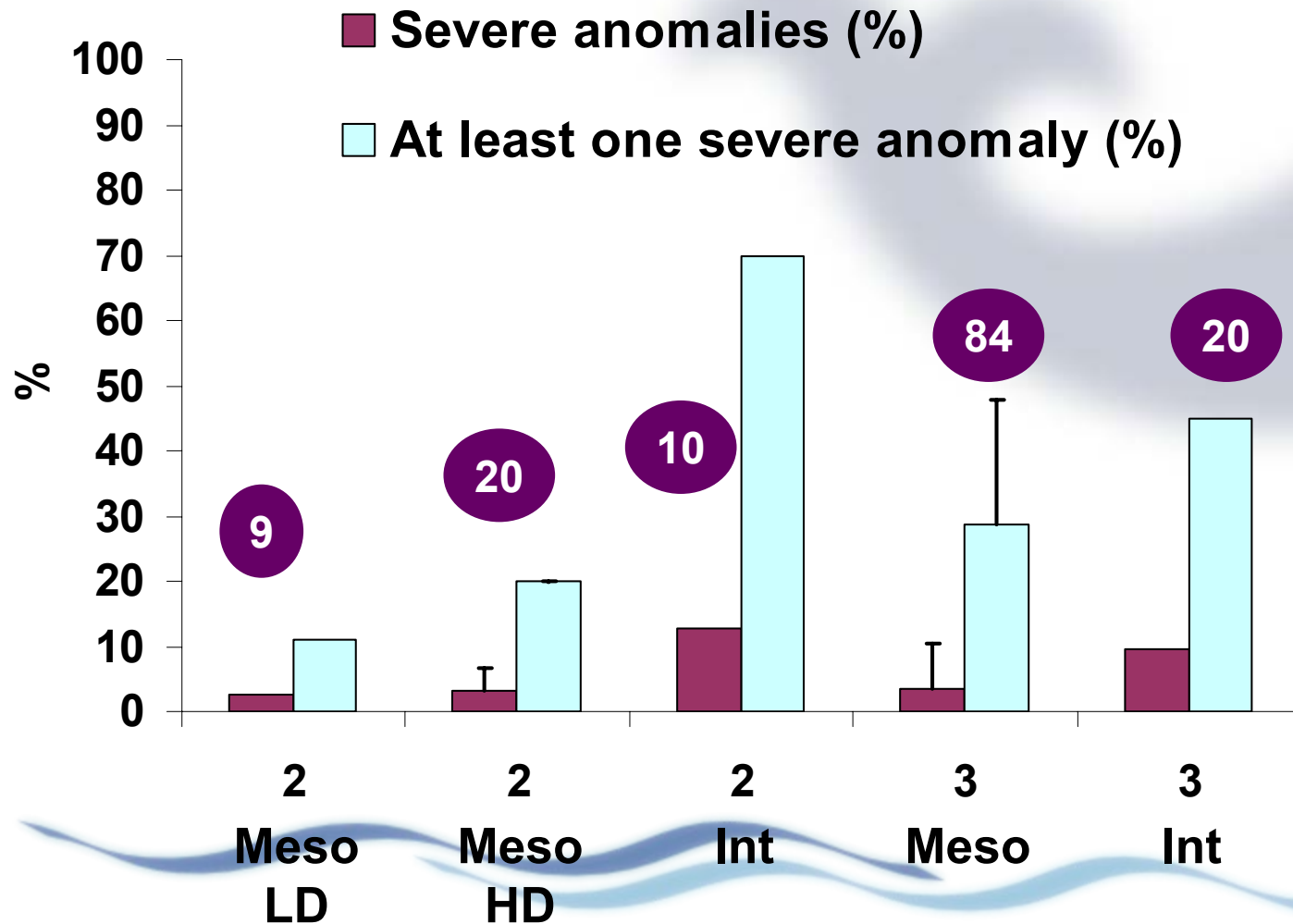
Higher fish yield for mesocosms with water from growout E.P. and external feeding



# Results: Seabream malformations



Higher number of individuals with severe anomalies in the intensive system

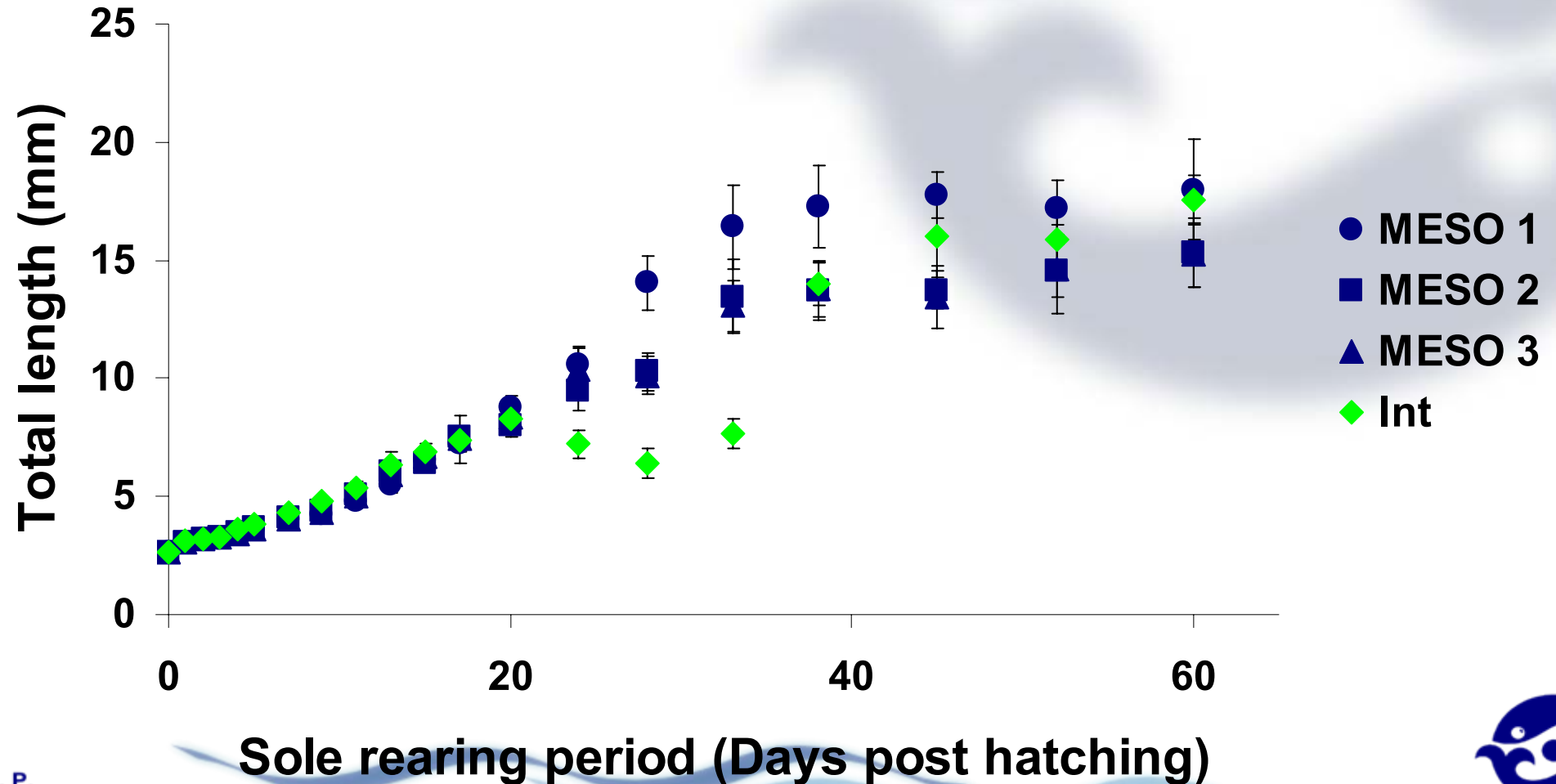


# Results: Sole larvae growth



Similar growth in both systems

Higher problems with density in intensive system





# Conclusions



- Higher growth performance with higher final weight
- Higher yield with lower severe anomalies
- Water source can have an important influence on yield
- Lower initial and maintenance costs
- Special attention for diseases and environmental fluctuations

Thank you!!!

Questions?