Olhão, Portugal
www.sparos.pt

HATCHTOOLS:

Feeding optimization TOOLS for precision HATCHery management

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Product Manager, on behalf of SPAROS

Tailoring
your feeds

AGENDA

1. HATCHTOOLS project

- Intro
- Feed trials with Halibut

2. Web-app

- Showcase

…Q&A

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HATCHTOOLS – *Challenge*

Feed costs represent a large proportion of operational costs

Feeding planning & management can include uncertainties

Most feeding strategies are based on trial and error

Tools to support more informed decisions are needed

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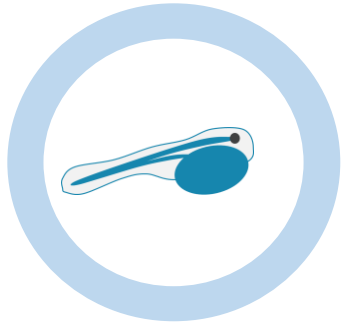
HATCHTOOLS – *Value Proposition*

Data-Driven Interface

Hatchery managers
Production manager
Feed manager
R&D manager
Field teams

- User-friendly Data analysis tools
- Fefeeding optimization
- Performance benchmarking



Make more informed decisions

by analyzing fish performance in production or trial settings

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HATCHTOOLS – *Early Nutrition*

Emergent species

- Turbot
- S. sole
- A. halibut

Improve

HATCHERY Production

Tailored nutritional solutions

- Reduce Live feed
- Increase larvae robustness
- Improve juvenile quality

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HATCHTOOLS

TAILORED nutritional solutions

TOOLS to support more informed decisions

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HATCHTOOLS - *Consortium*

OTTER FERRY SEAFISH
INNOVATORS IN SUSTAINABLE AQUACULTURE

#Halibut farming

FLATLANTIC
SEASTAINABLE FLATFISH VILLAGE
MIRA · PORTUGAL

#Turbot & Sole farming

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#Feed production

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1st Trial - *modelling*

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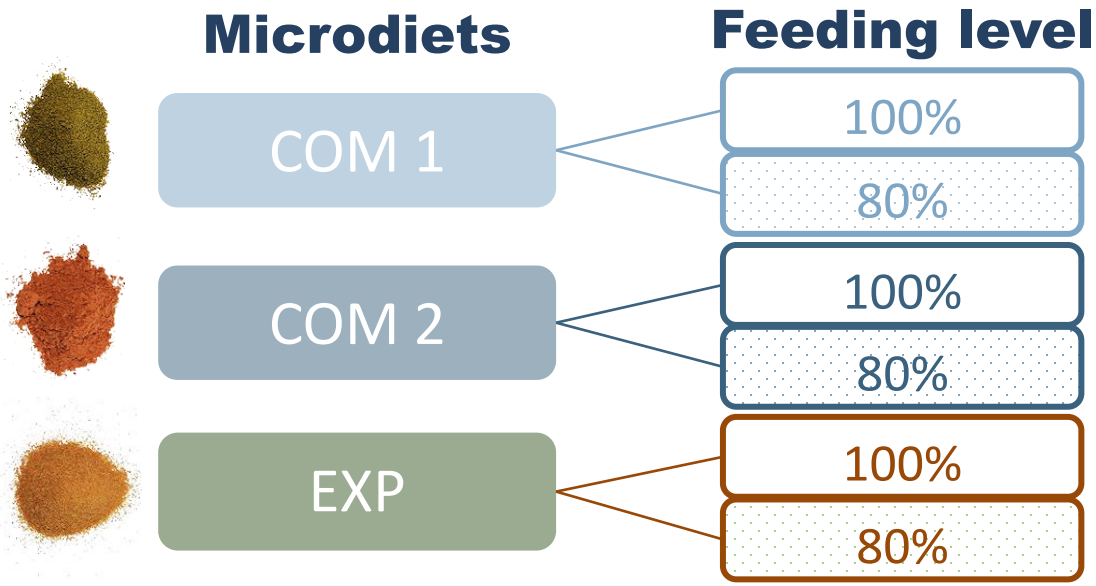
1st TRIAL - *Post-larvae*

Objective:

- Evaluate feed intake and growth performance of **halibut post-larvae** fed three diets at two different feeding levels

Trial features:

- From 107-148 DAH (42 days)
- 6 treatments



- Sampling: zootechnical parameters (WW, TL, RGR, FCR, FI, Survival)

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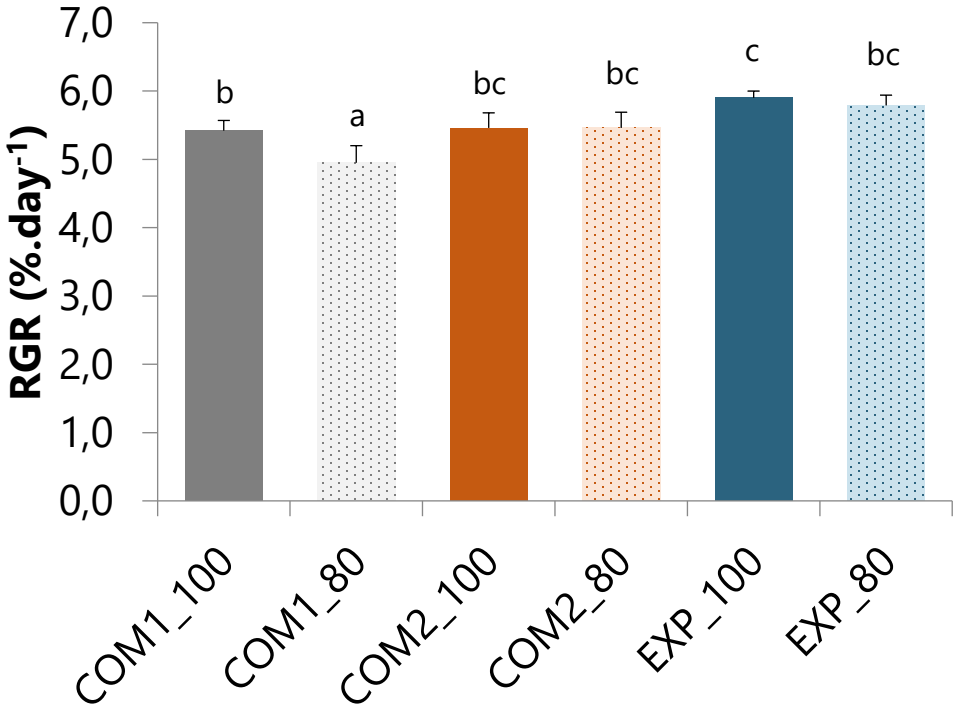
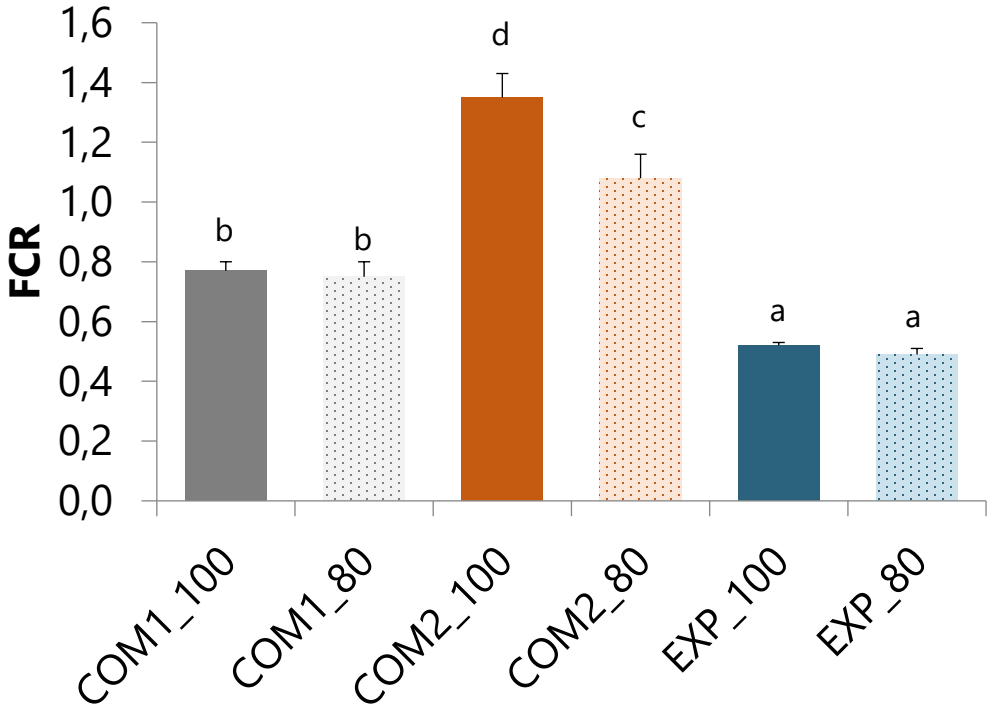
1st TRIAL - *Post-larvae*





- Both **COM2 and EXP** groups tended to have higher growth, irrespective the feeding level
- **EXP** with the lowest Feed Conversion Ratio, both at 100% and 80% ($P<0.05$)

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FINAL REMARKS - *1st TRIAL Post-larvae*

- **Halibut fed on 100% feeding level did not necessarily have the best growth performance indicators**
  - Lower FCR at 80% feeding in COM2 group, despite similar RGR

- **EXP group showing high RGRs and the most efficient FCR**
  - Greater growth is not explained by increased feed consumption, since fish fed the EXP diet consumed less feed and presented lower FCR
  - It appears to be induced by a more balanced nutritional composition of the EXP diet (e.g., higher protein content: around 66% vs 54-56%)

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2nd Trial - *Juveniles*

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2nd TRIAL - *Juveniles*

Objective:

- Evaluate growth performance of halibut juveniles fed 3 experimental diets – **different protein sources** - and benchmark.

Trial features:

- From 180-221 DAH (42 days)
- 4 treatments

COM
~55% Protein

EXP 1
~65% protein; Krill

EXP 2
~65% protein; Squid

EXP 3
~65% protein; Fish

- Sampling: zootechnical parameters (WW, TL, RGR, FCR, Survival)

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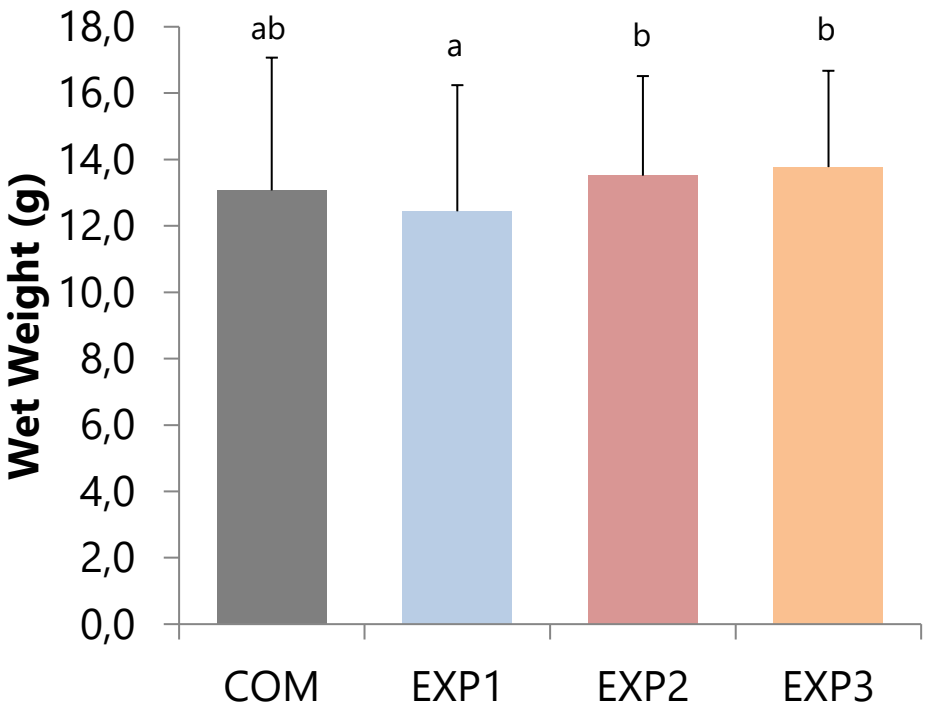
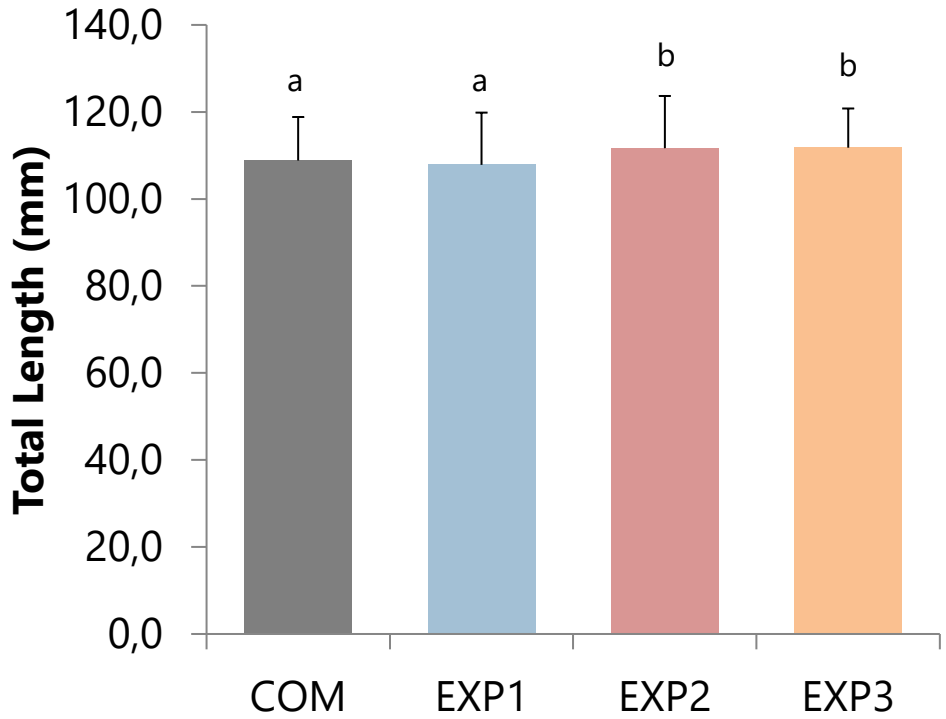
2nd TRIAL - *Juveniles*





- **EXP2** and **EXP3** showing significantly higher final WW than EXP1 ($P<0.05$)
- **EXP2** and **EXP3** fed fish showing the highest TL ($P<0.05$)

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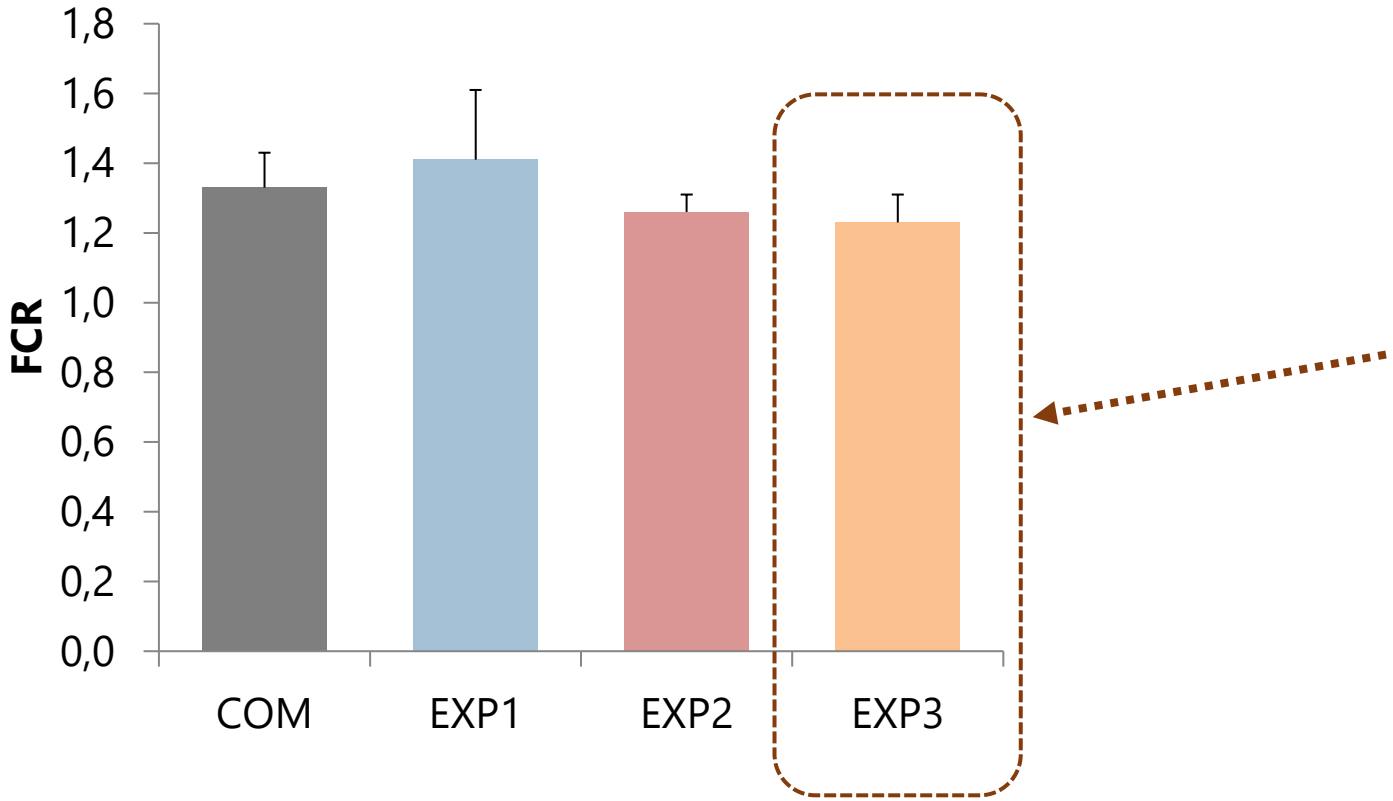
2nd TRIAL - *Juveniles*



- **EXP 3** tended to have lower FCR ~1.23

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FINAL REMARKS – *2nd TRIAL Juveniles*

HATCHERY
FEED & MANAGEMENT

- **Halibut fed with SPAROS EXP2 and EXP3 showed overall the best performance parameters**
  - Higher total length than fish fed COM ($P<0.05$)
  - In particular, EXP3 tended to have lower FCR

- **Increased levels of protein** & **specific protein sources** of EXP2 and EXP3 seem to be related to improved growth parameters

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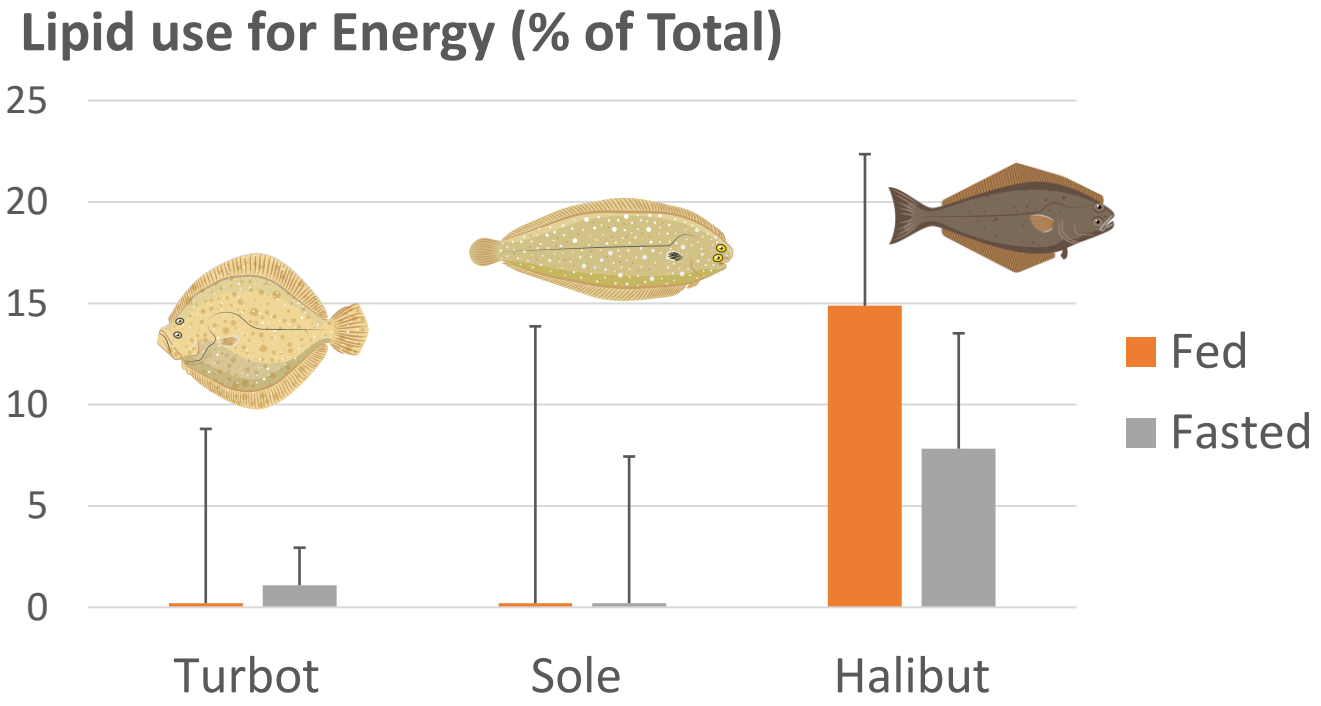
Respirometry trials (O:N ratios)
Flatfish young juveniles



Respirometry set-up (sole)

O:N ratios Combine Oxygen consumption and Ammonia excretion to determine the relative utilization of protein and lipid as energy sources:

- *Only lipid: ~415 O:N ratio ; Only protein: ~6.8 O:N ratio*

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3rd Trial - *Weaning*

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3rd Trial - *Weaning*

Objective:

- Evaluate performance of halibut larvae fed four experimental weaning diets – **varying lipid & Phospholipid sources** - and benchmark with 2 COM diets.

Trial features:

- From 75-137 DAH (63 days)
- 5 treatments

COM1

COM2

EXP 1
Algae+Fish & Veg PL

EXP 2
Algae & Mix PL

EXP 3
Algae & Mar PL

EXP 4
Algae & Veg PL

- Sampling: zootechnical parameters (WW, TL, RGR, FCR, Survival)

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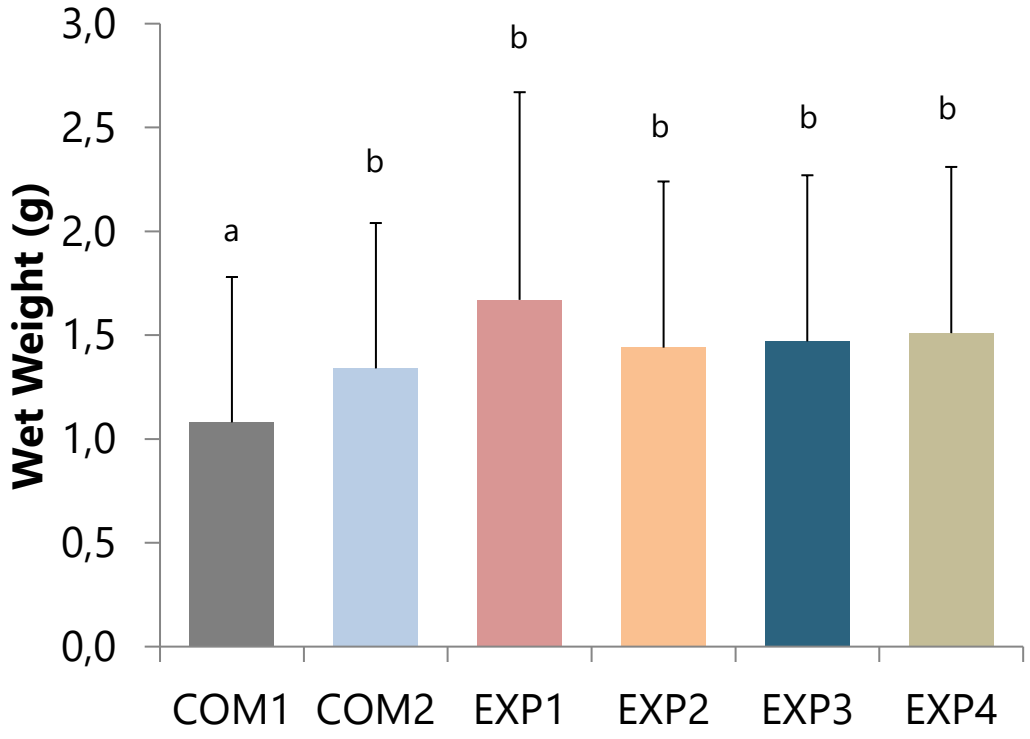
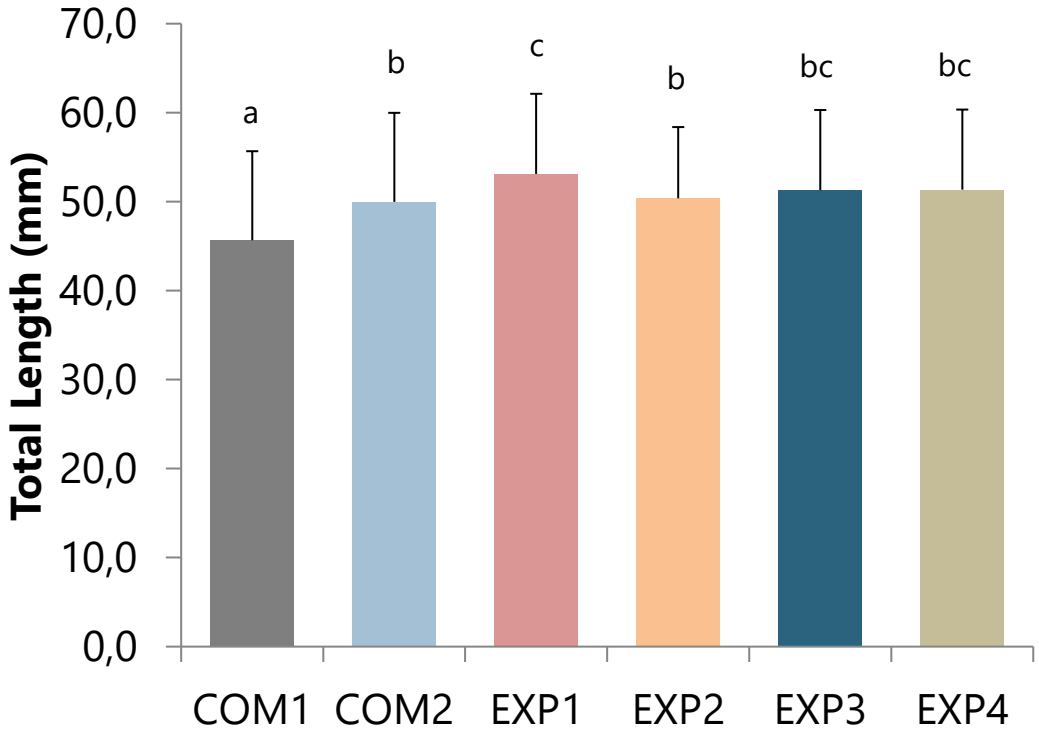
3rd Trial - *Weaning*





- **EXP1** tended to have higher WW and showed the highest TL, compared to other COM diets (P<0.05)

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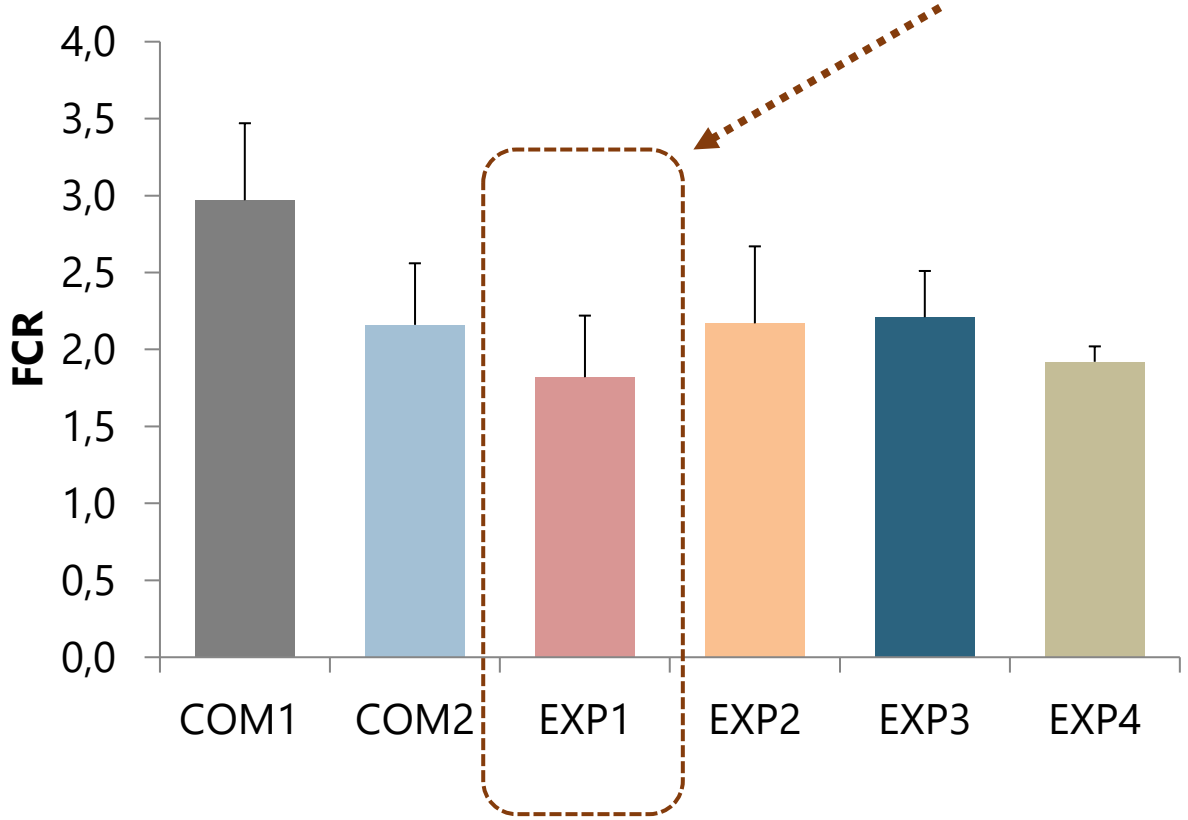
3rd Trial - *Weaning*



- **EXP1** tended to have lower FCR~1.82

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FINAL REMARKS – *3rd Trial Weaning*

- **Overall, SPAROS diets associated with good performance indicators** in halibut larvae, with **EXP1** tending to have slightly improved parameters

- **Halibut larvae tolerated well the diets with diverse Lipid and PL sources**, which are highly digestible and easily metabolized.

WEANING can be further improved through customized nutrition

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TAKE HOME message

- **Lower feeding levels (80%) can lead to improved FCR**
  - Keeping good growth performance
  - Lower feed waste, hence keeping good water quality
- **Increased protein level related to improved growth performance**
  - Protein as preferable metabolic substrate for energy production in halibut post-larvae and juveniles
- **Highly digestible Lipid & PL sources associated with good performance**

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TAKE HOME message

There's NO "one size fits all…"

TAILORED NUTRITION for fish larvae is key!

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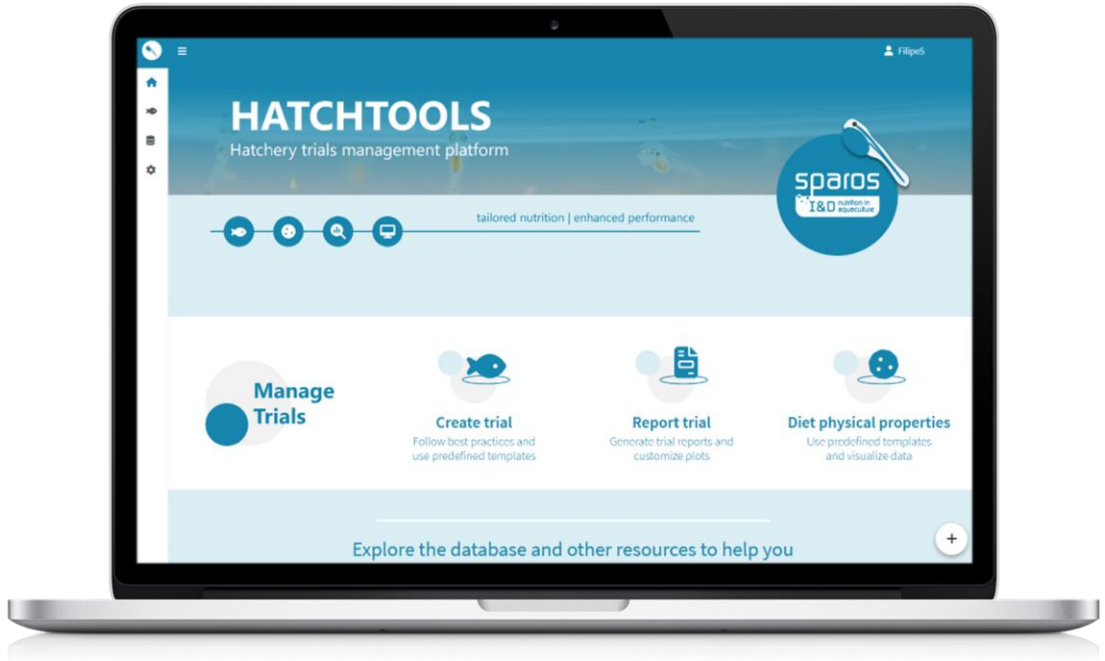

Trial management platform

- R&D data management
- Report automation
- Plot customization

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DIGITAL NUTRITION

COLLABORATION

Aimed to address specific needs of fish farms

- Data analysis
- Customized feeding plans
- Predictive modelling
- Web-app development

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Thank you!

Acknowledgments

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