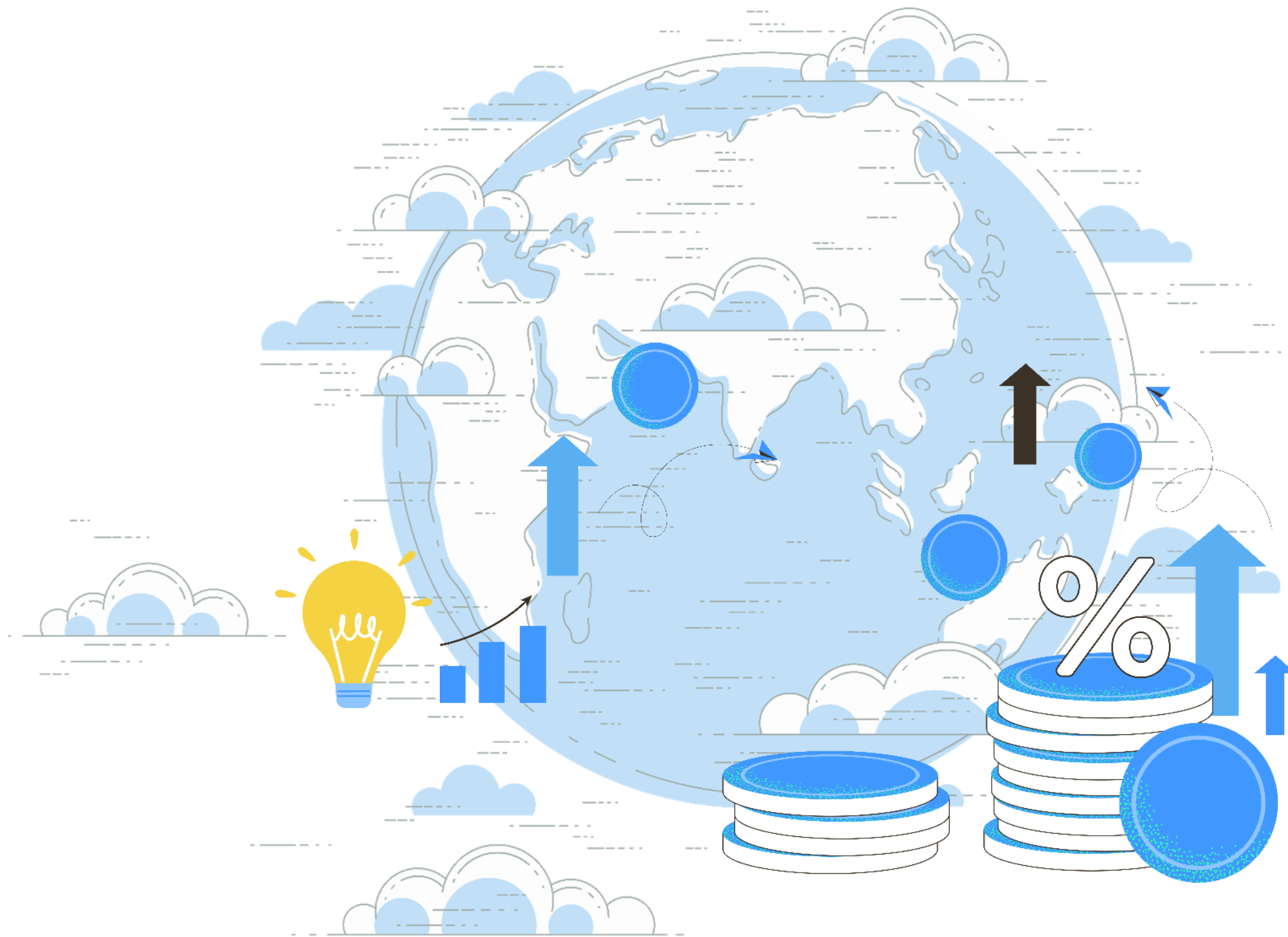



 **Huelva**
Del 18 al 20 de octubre de 2022

Foro Internacional de transferencia del Conocimiento en Economía Azul



 **AGENCIA DE GESTIÓN AGRARIA
Y PESQUERA DE ANDALUCÍA**
Consejería de Agricultura, Ganadería
Pesca y Desarrollo Sostenible

 **Interreg**
España - Portugal
Fondo Europeo de Desarrollo Regional



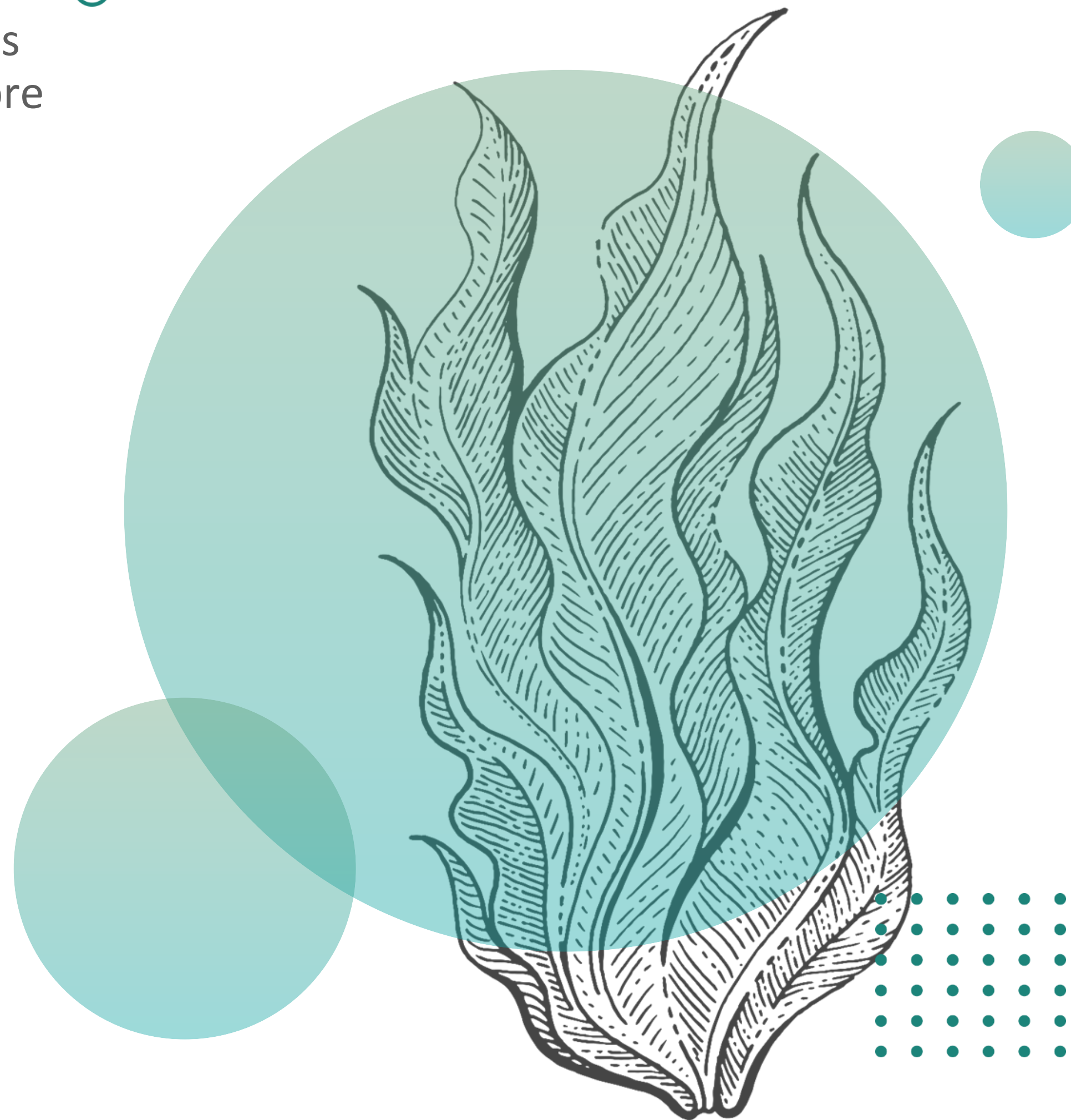
 **Atlazul**

20



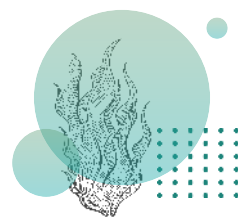
Jueves
octubre
2022

Ayamonte



Microalgas, Macroalgas y Probióticos en la Formulación de Piensos para Acuicultura

Microalgas, Macroalgas e Probióticos
na Formulação. de Piensos para
Acuicultura



Artemias y rotíferos como alimentación en las primeras etapas. Mejora de su perfil nutricional en base a microalgas

Artemias e rotíferos como alimentação nos primeiros estádios de desenvolvimento. Otimização do seu perfil nutricional através de microalgas

20



Jueves
octubre
2022

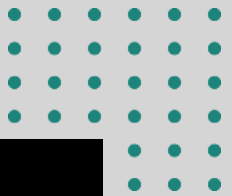
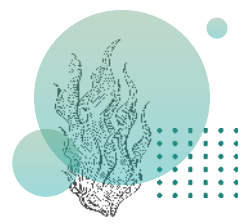
 Ayamonte

Patricia Diogo

Gestora de Inovação e
Desenvolvimento de produto

necton

phyto
bloom
microalgae for dynamic people



O que é alimento vivo?

Curtos ciclos de vida e rápido crescimento

Dimensões reduzidas adequadas á boca das larvas de peixe marinhas

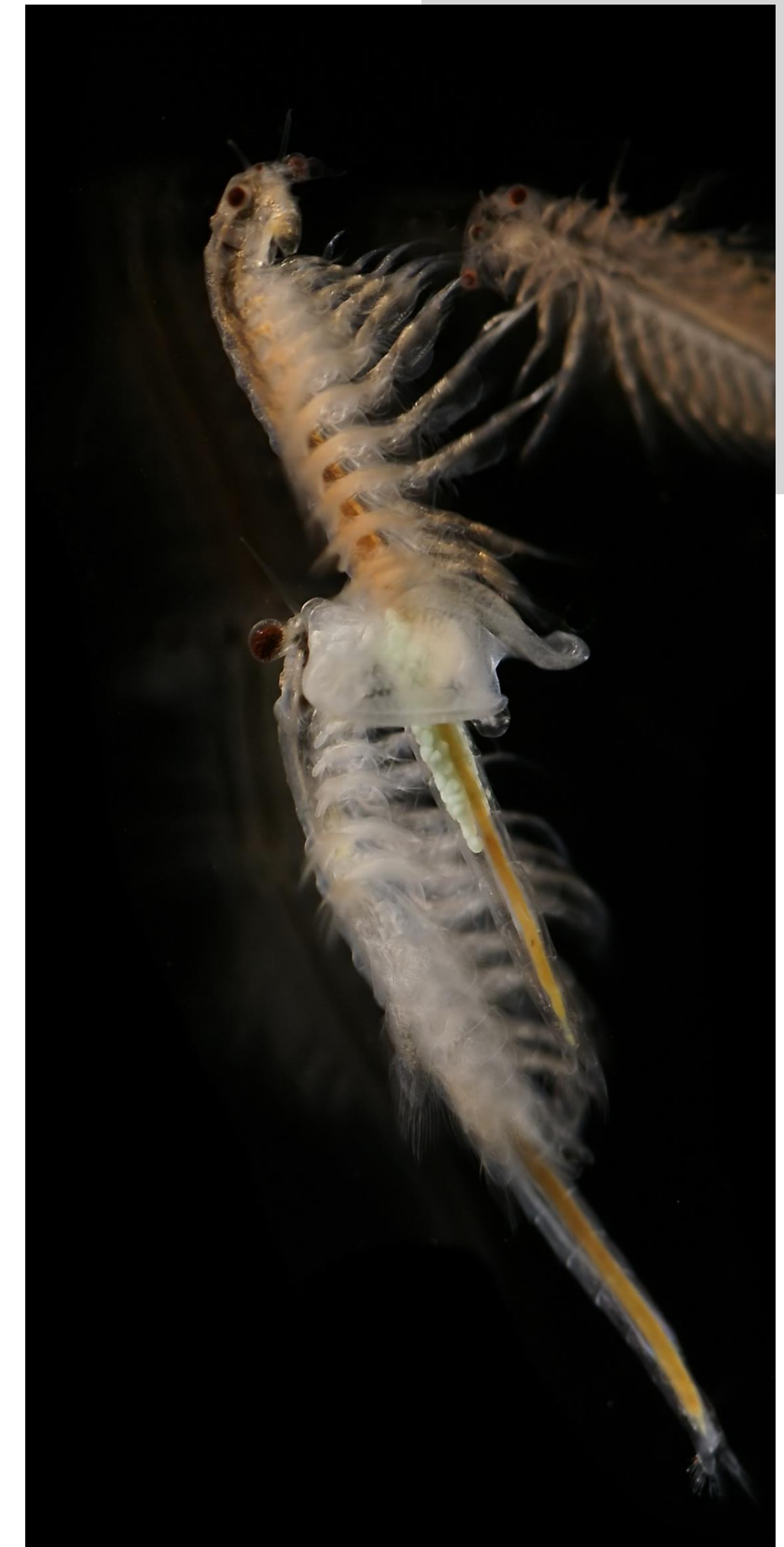
Filtradores não seletivos com requisitos nutricionais moderados e que podem ser enriquecidos nos nutrientes a vetorizar para as larvas

Melhoram o bem estar animal e a sua capacidade predatória, reduzindo o stress das larvas associado a cativeiro

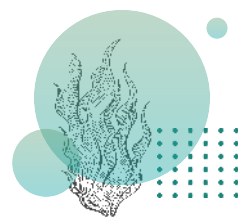
Elevada resistência a stress e manipulação



- Reduzidas dimensões
- Podem ser mantidos nas instalações sob reprodução assexuada continuamente

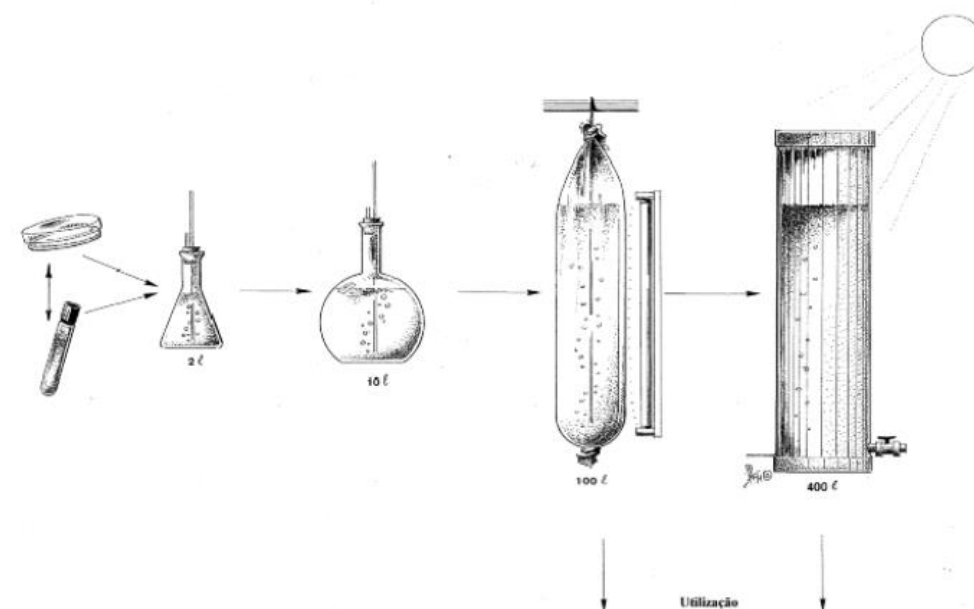


- Maiores dimensões do que rotíferos
- Náuplios contêm reservas e não apresentam boca
- - A partir de metanauplios é necessário enriquecer

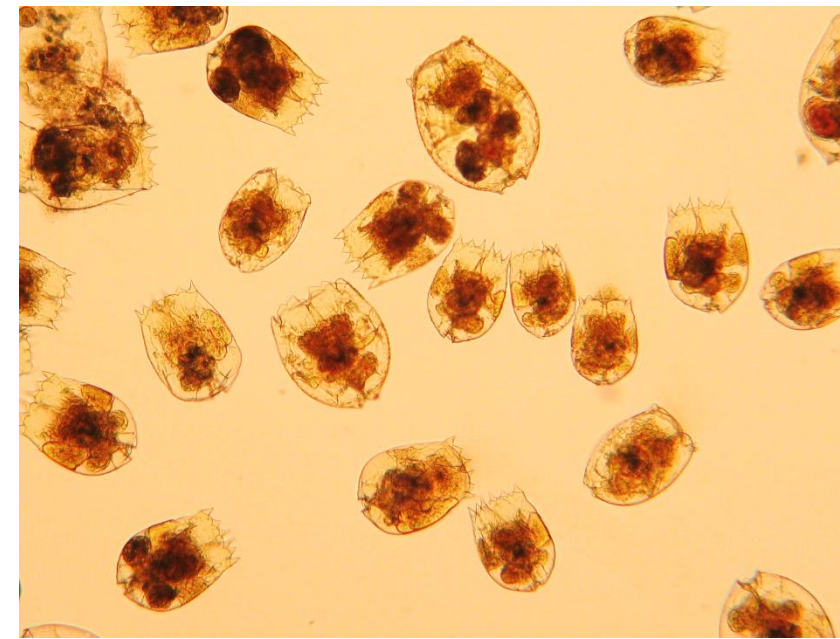


Aplicação de alimento vivo em aquacultura

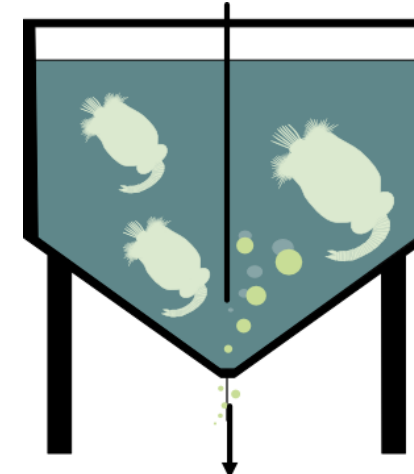
Fitoplâncton



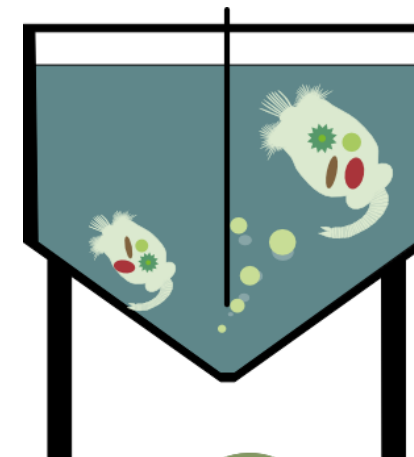
Zooplâncton: Rotíferos



Cultivo



Enriquecimento



Zooplâncton: Artémia



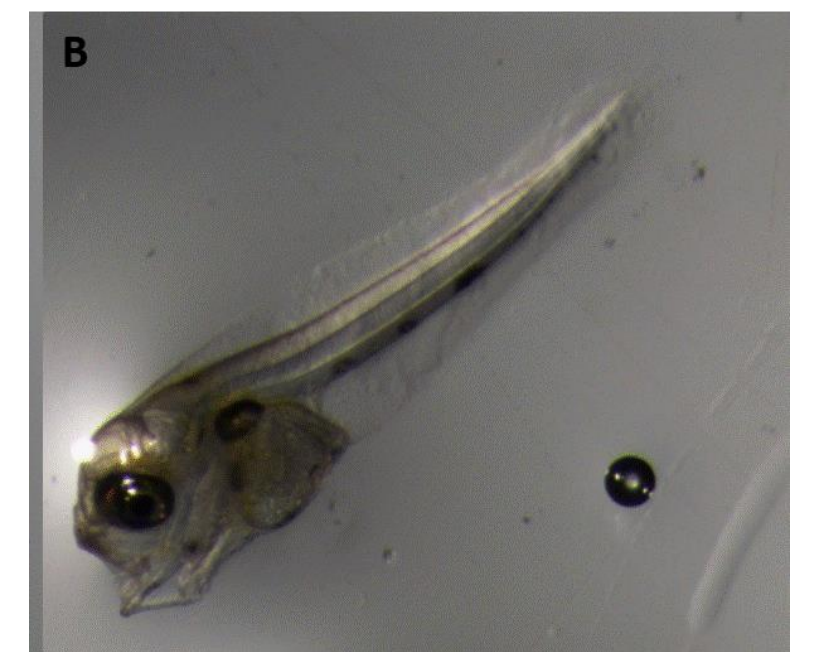
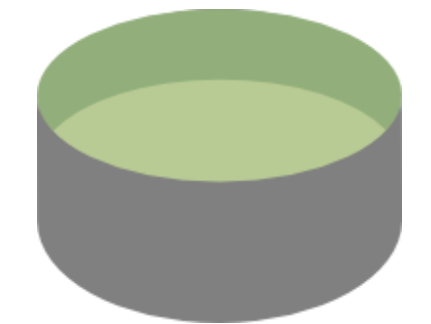
Eclosão de náuplios (24h)



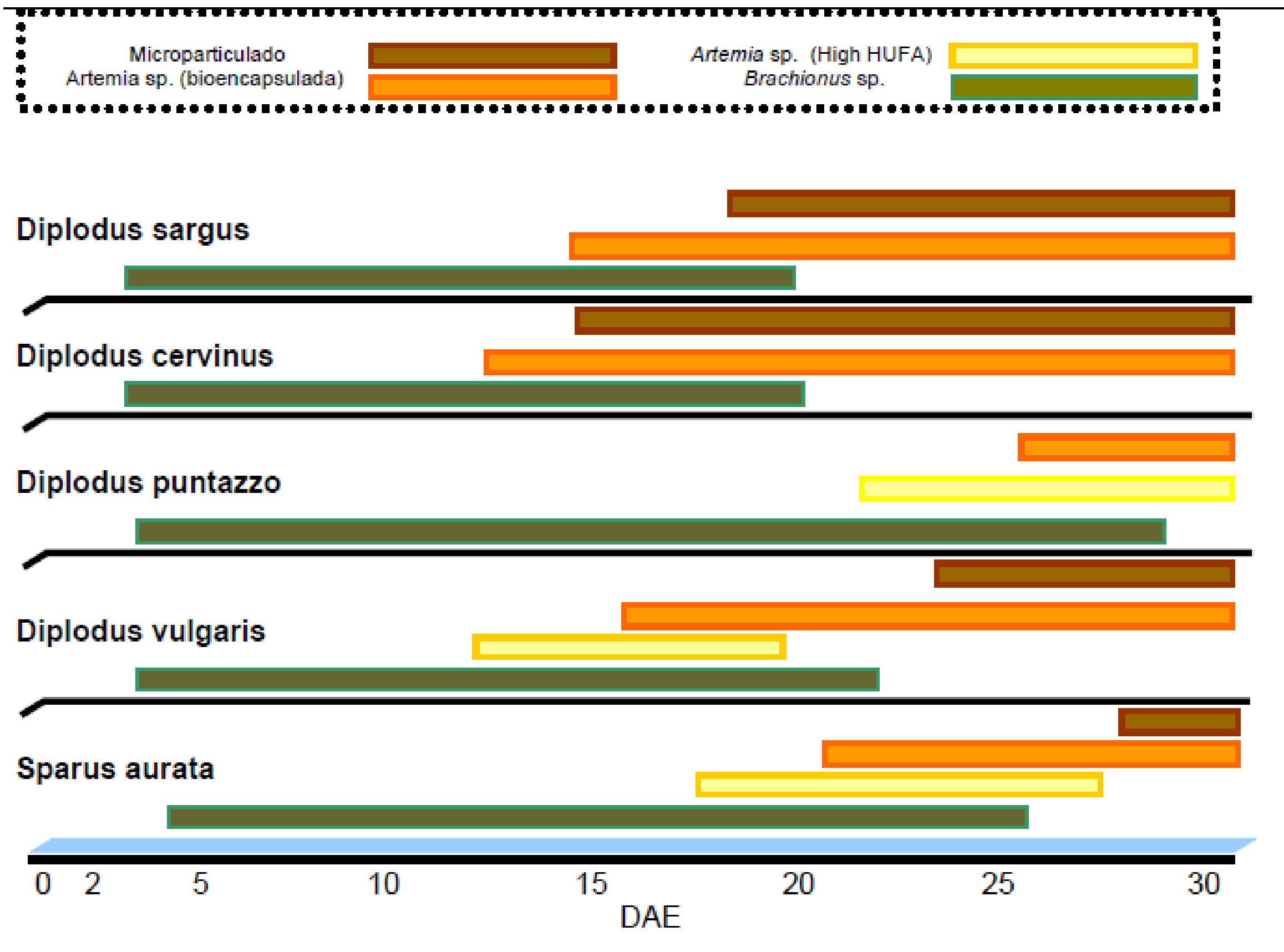
Enriquecimento
de metanauplios



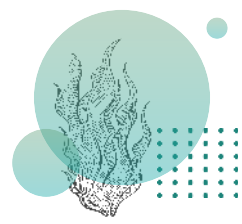
Larvicultura marinha



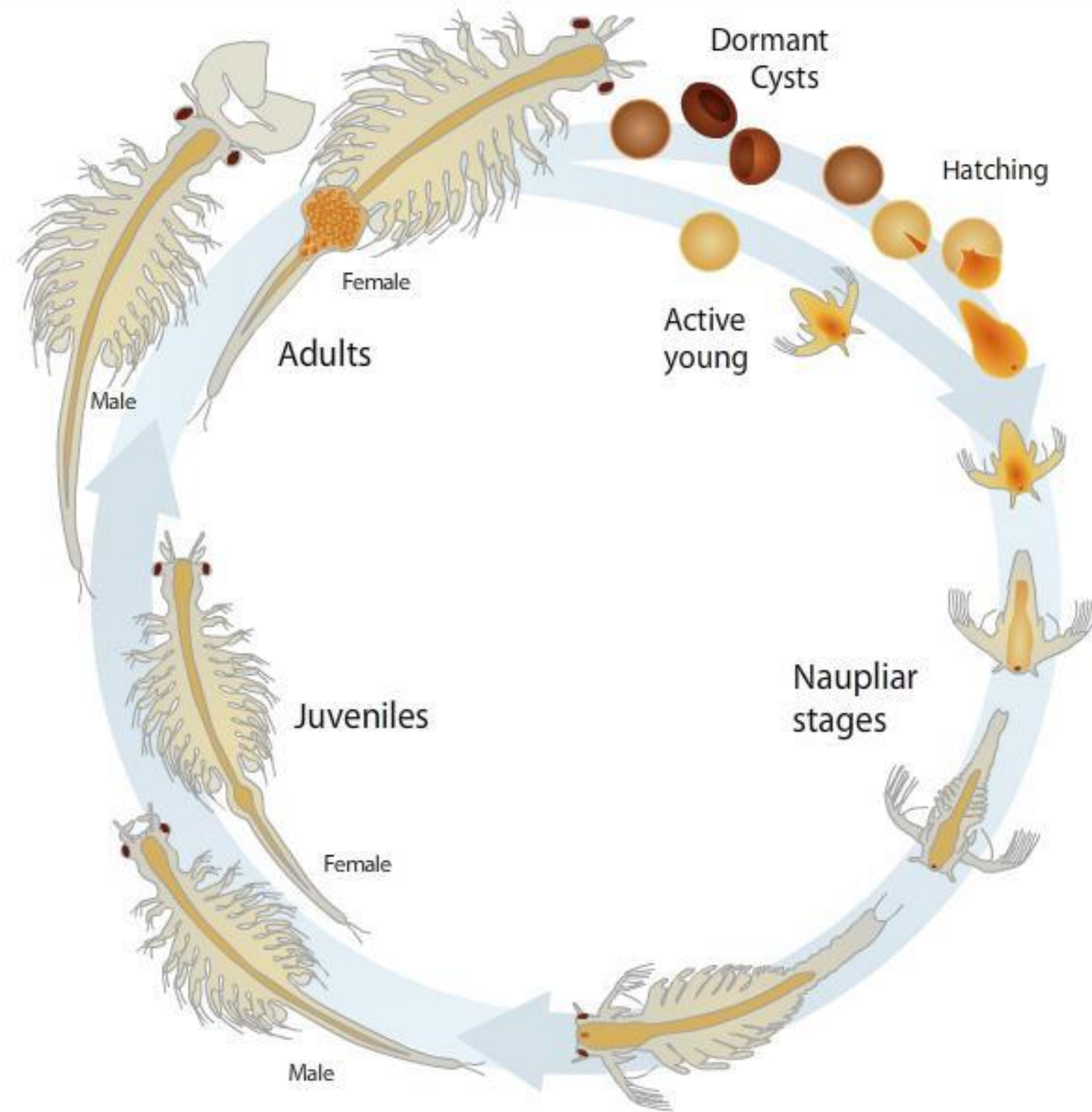
Aplicação de alimento vivo em aquacultura



Os protocolos alimentares encontram-se bem estabelecidos no entanto o desenvolvimento de produtos de microalgas para enriquecimento de alimento vivo requer otimização do ponto de vista nutricional e do ponto de vista técnico



Artémia



Utilização de Artémia em aquacultura

Utilização de cistos em diapausa coletados através de pesca

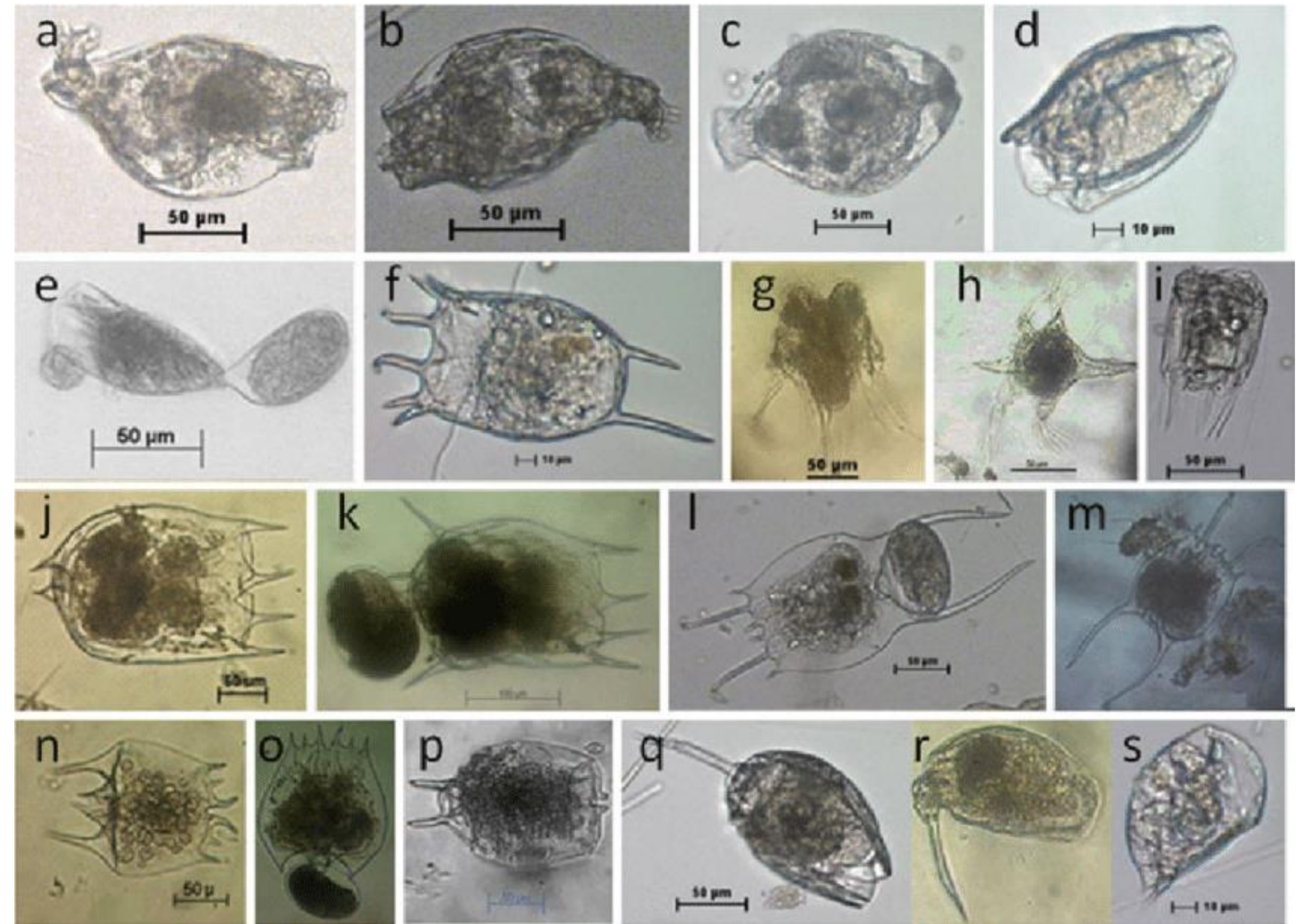
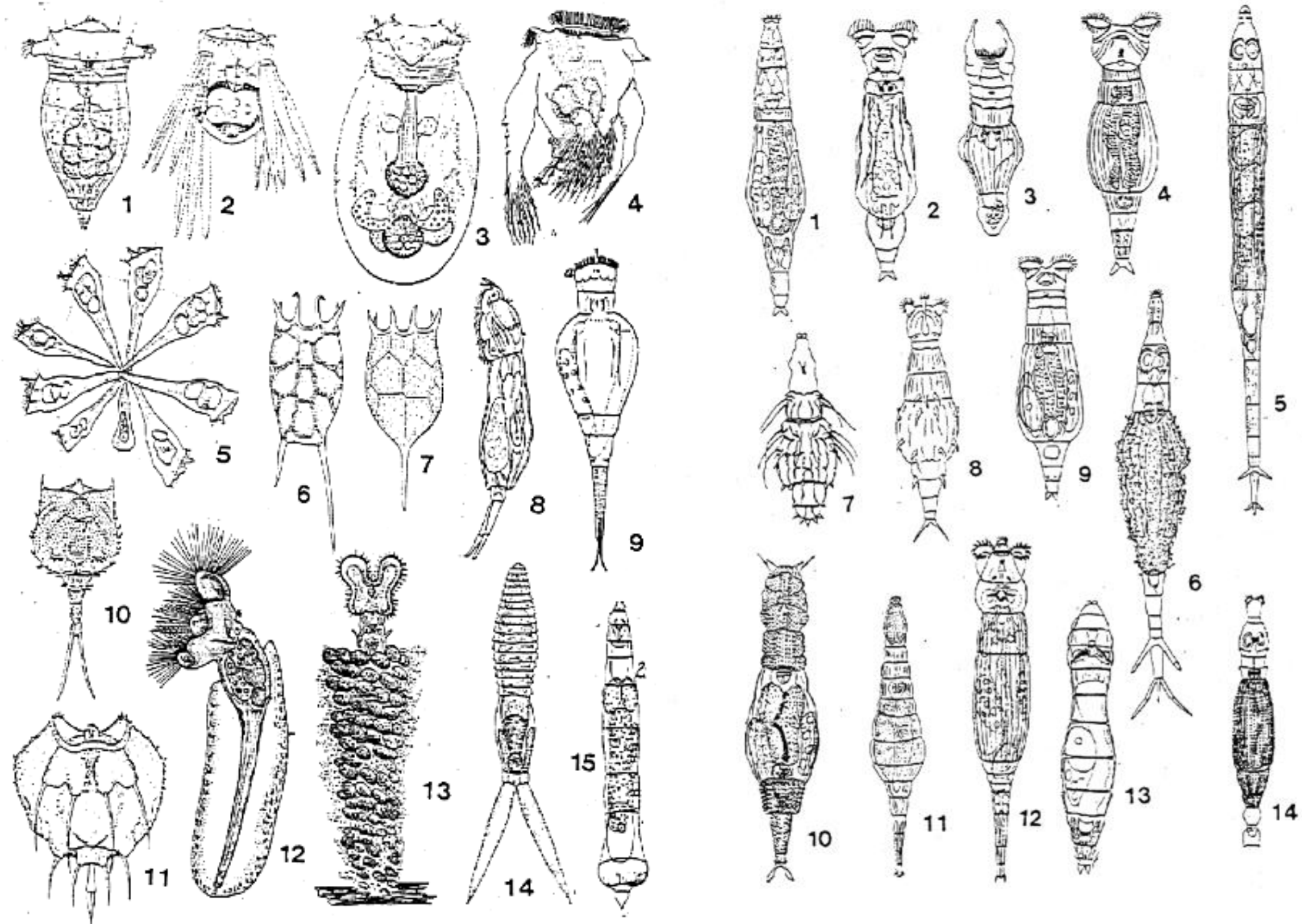
Utilização de náuplios de Artémia (eclosão em 24h) com composição nutricional inerente e relativamente constante por estirpe

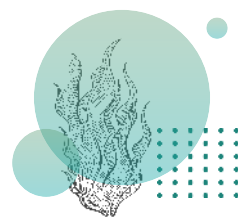
Utilização de metanáuplios de Artémia (após 48h Instar 1, II etc) que requerem enriquecimento pois já consumiram reservas e apresentam boca

Não se fecha o ciclo de vida da Artémia em aquacultura apesar de ser possível

Os produtos utilizados para enriquecimento para nutrição de larvas marinhas pode ser otimizado de forma a reduzir a utilização de fontes marinhas não sustentáveis

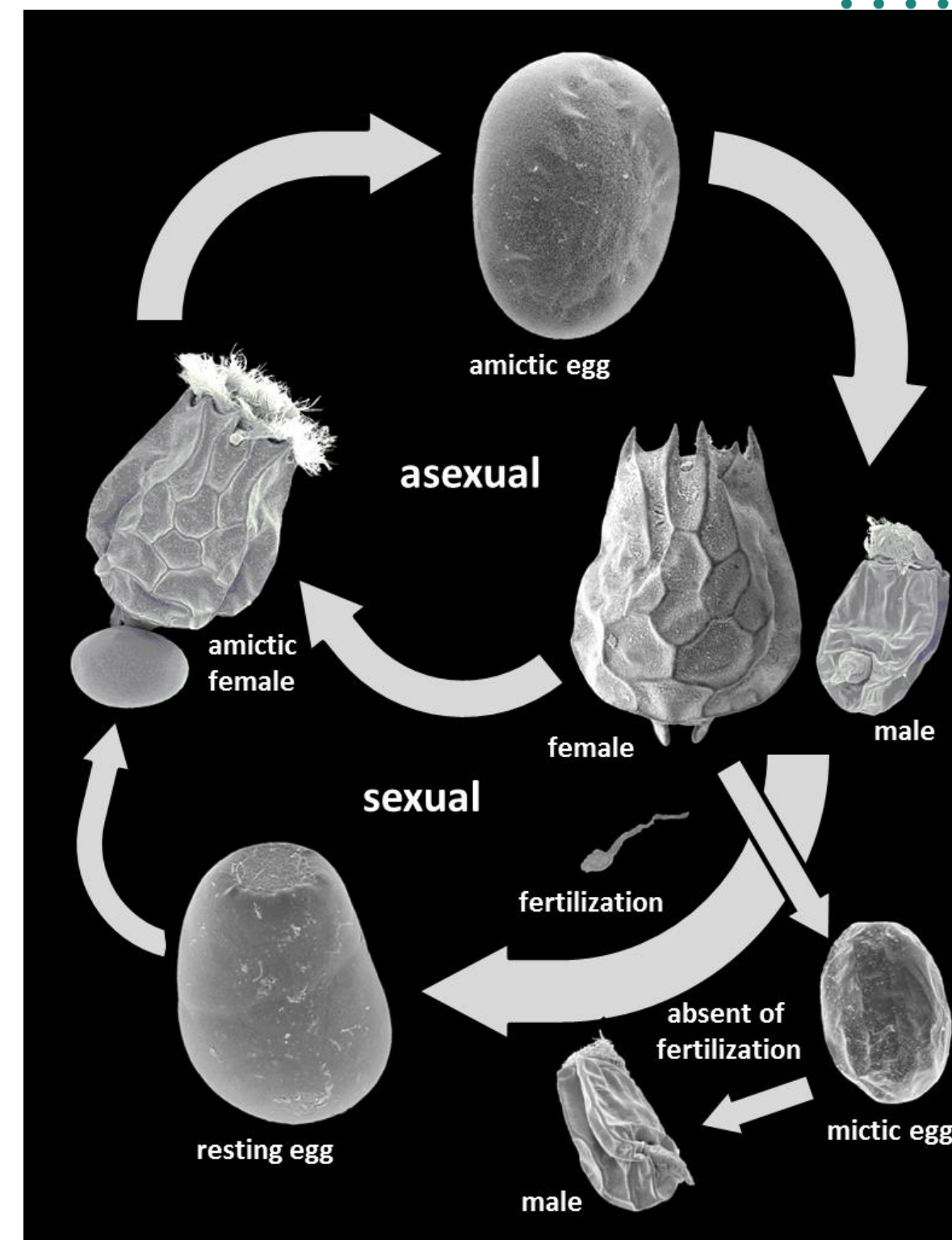
Rotíferos





20 jueves / octubre
2022

A pouco compreendida vida sexual de *Brachionus plicatillis*



01. Padrões de reprodução partenogénica ou amíctica

Ovos amícticos – mitose, ovo não pode ser fertilizado, nasce fêmea idêntica à mãe

Ovo mictico – meiose, se não for fertilizado nasce macho

02. Fatores que afetam a mixis

Indução de mixis – metabolitos produzidos pelos rotíferos sob determinadas condições como densidade populacional Hagiwara et al.(1994)

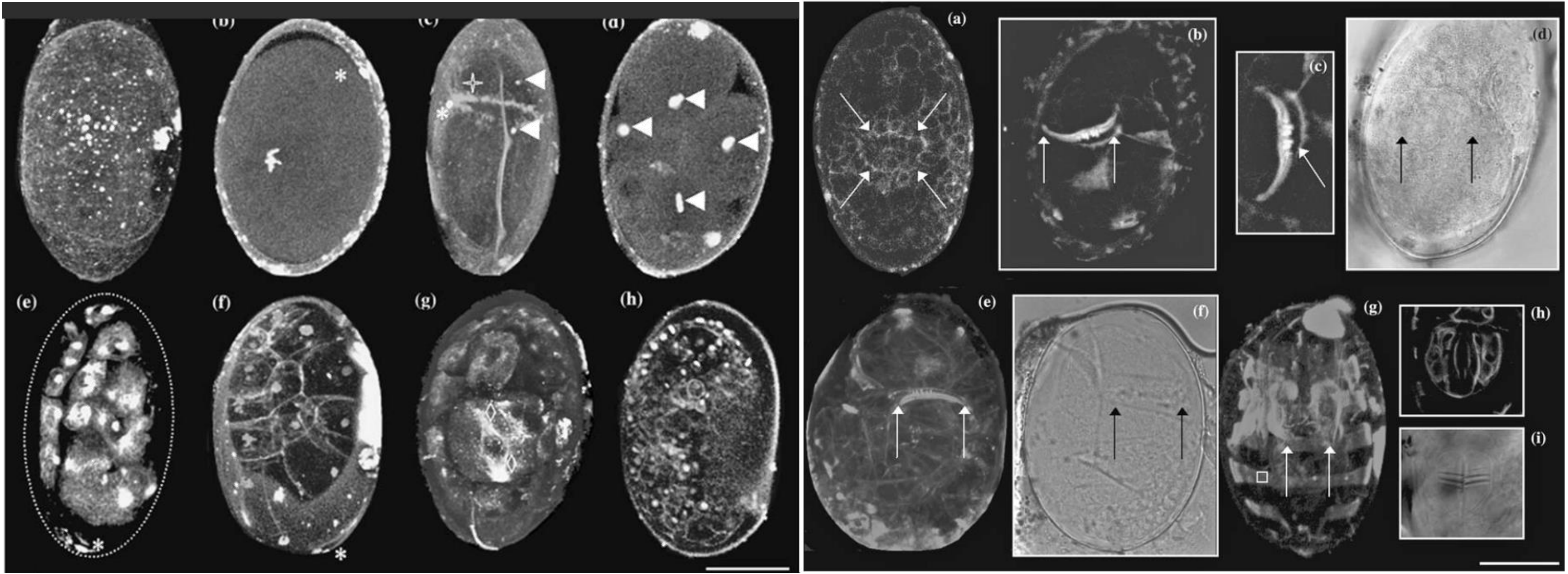
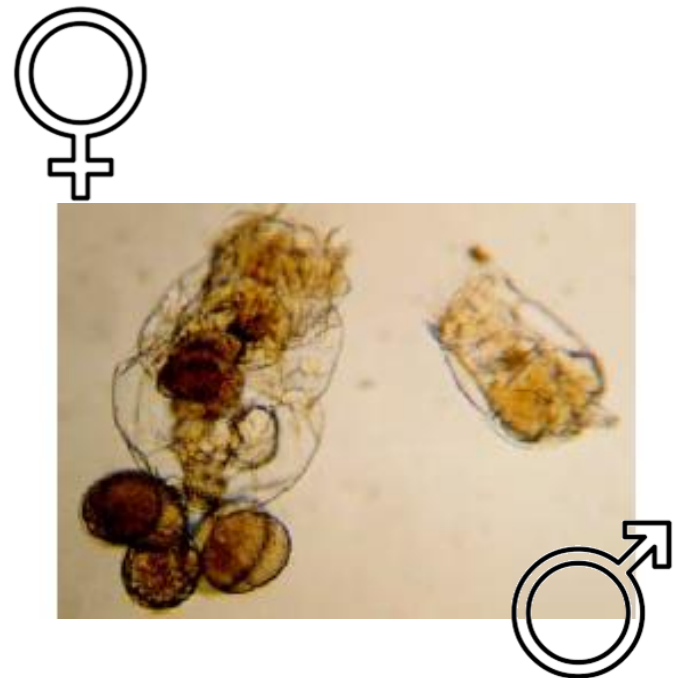
03. Efeito da luz no desenvolvimento embrionário

Eclosão aumenta em comprimentos de onda baixos 400–480 nm em *B. Rubens* (Blanchot & Pourriot, 1982a) and 347–400 nm em *B. plicatillis*

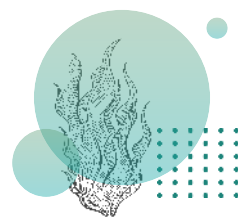
04. Efeito da temperatura no desenvolvimento embrionário

A temperature altera o ratio de ovos pois influencia a frequência de produção de ovos e o tempo de eclosão de ovos partenogénicos (Sarma et al 2005)

Desenvolvimento embrionário rotíferos

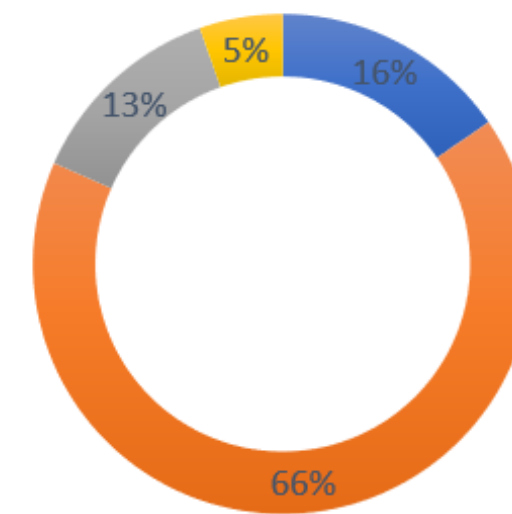


Em aquacultura utiliza-se alimento vivo do ponto de vista técnico
Os condicionamentos atuais no cultivo e enriquecimento de alimento vivo requerem maior investigação de metabolismo, reprodução e nutrição



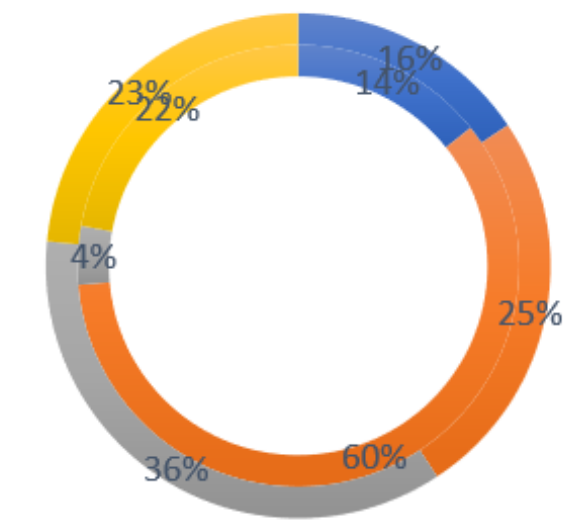
Combater um dogma: O rotífero não é um saco...

Microdieta



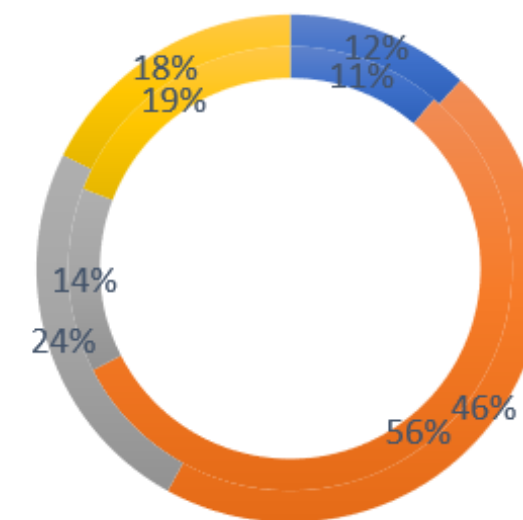
■ Lipidos (%) ■ Proteina (%) ■ cinza (%) ■ Hidratos de carbono (%)

Mistura A



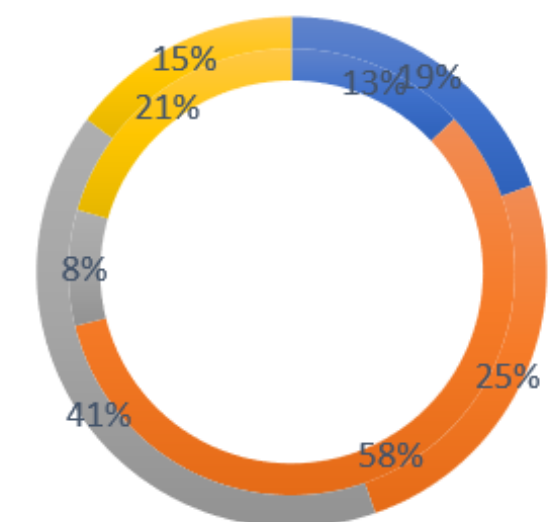
■ Lipidos (%) ■ Proteina (%) ■ cinza (%) ■ Hidratos de carbono (%)

Mistura B

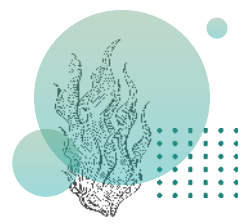


■ Lipidos (%) ■ Proteina (%) ■ cinza (%) ■ Hidratos de carbono (%)

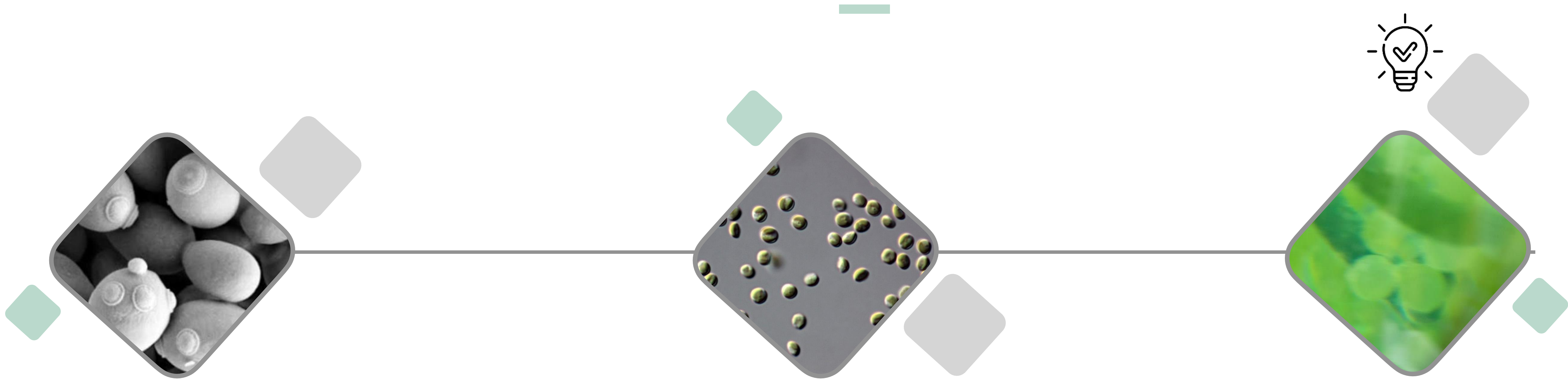
Mistura C



■ Lipidos (%) ■ Proteina (%) ■ cinza (%) ■ Hidratos de carbono (%)



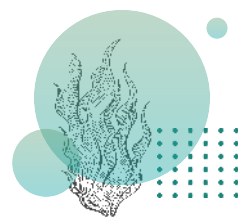
Requerimientos nutricionales de rotíferos ainda por compreender!



Os rotíferos continuam a ser cultivados rotineiramente com *Saccharomyces cerevisiae*

A *Nannochloropsis* sp. é das espécies de microalgas mais utilizadas em cultivo de rotíferos

No entanto... produtos comerciais de cultivo de rotíferos de elevado rendimento combinam microalgas com óleo de peixe...



Porque é que a *Nannochloropsis* sp. é a espécie mais utilizada para nutrição de rotíferos?

Fácil de cultivar

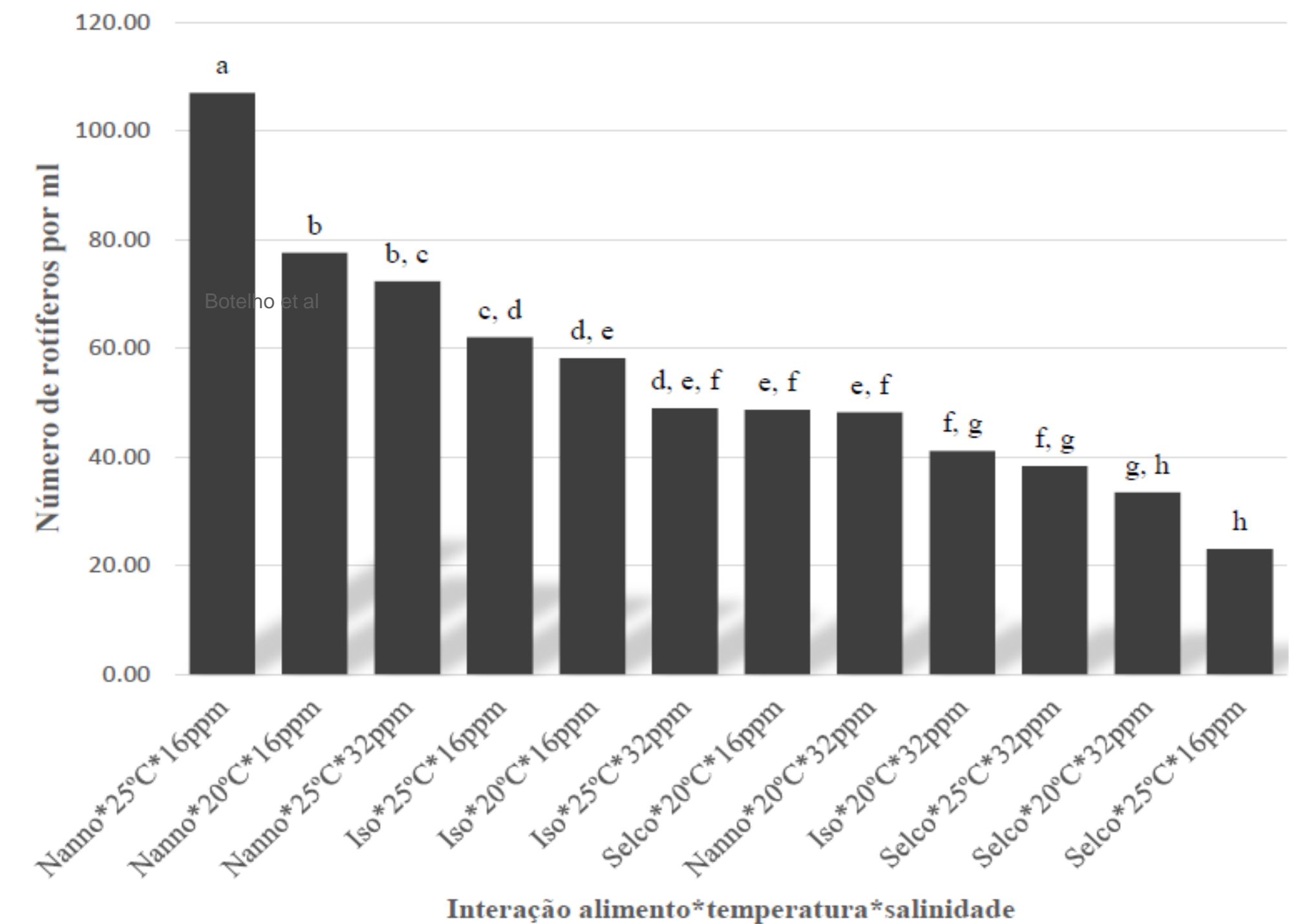
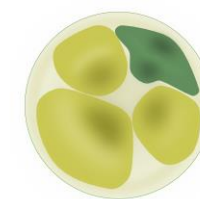
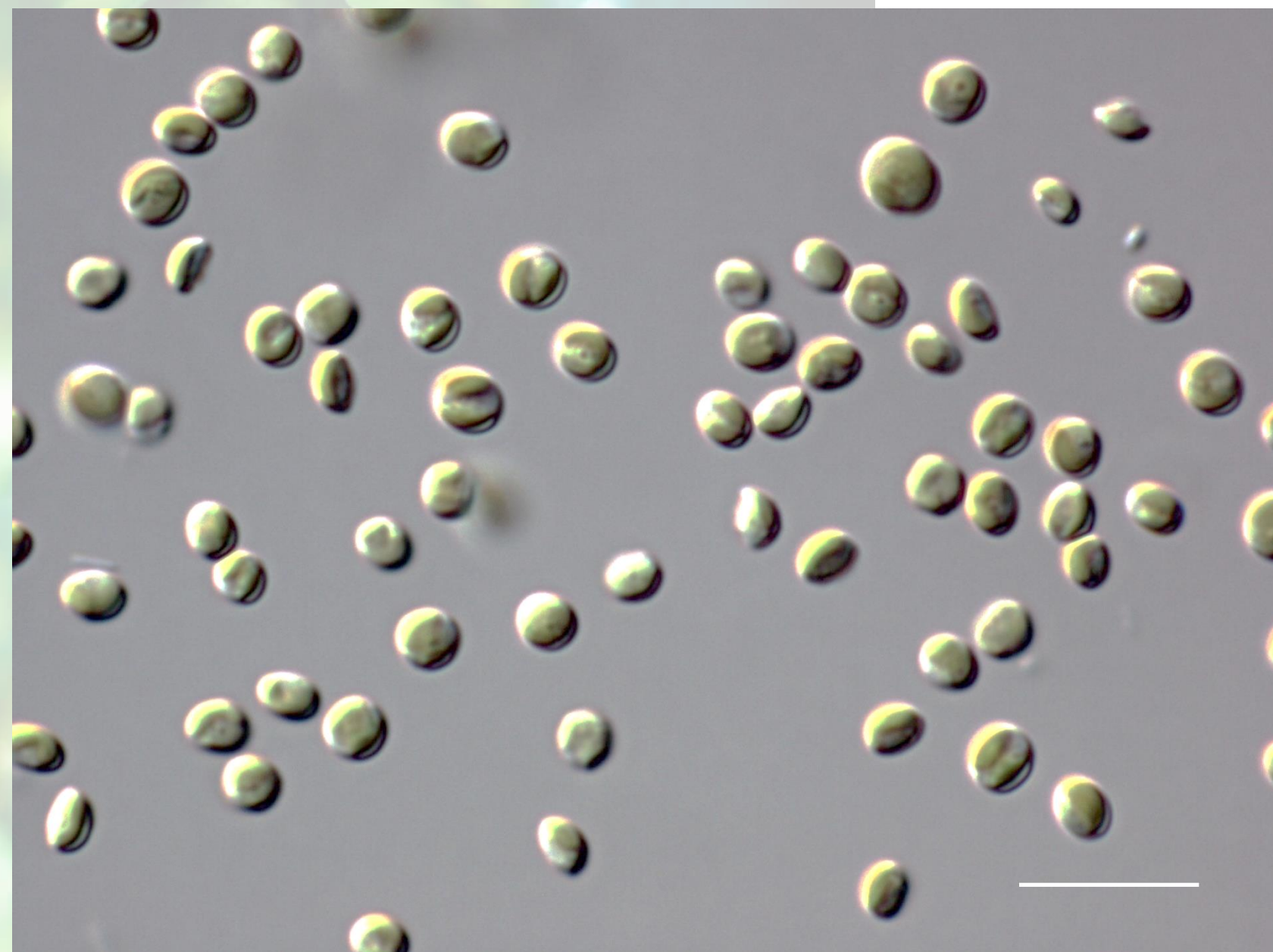
Espécie de microalga muito resistente

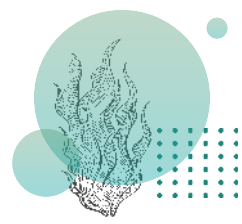
Elevada produtividade

Valor nutricional adequado para larvas e rotíferos

Elevada digestibilidade em rotíferos e larvas de peixes

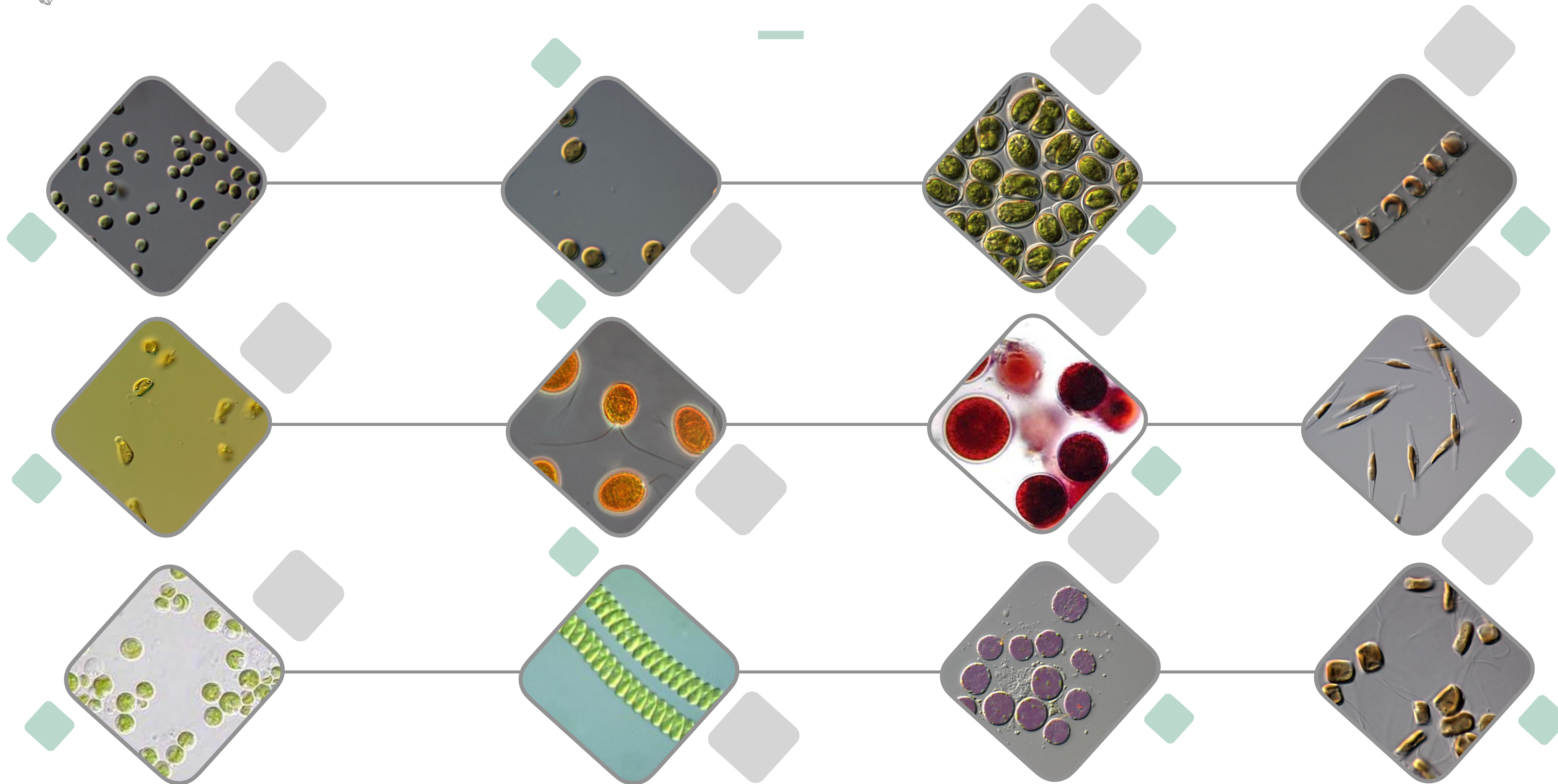
Com comportamento natatório e manutenção adequada na coluna de água



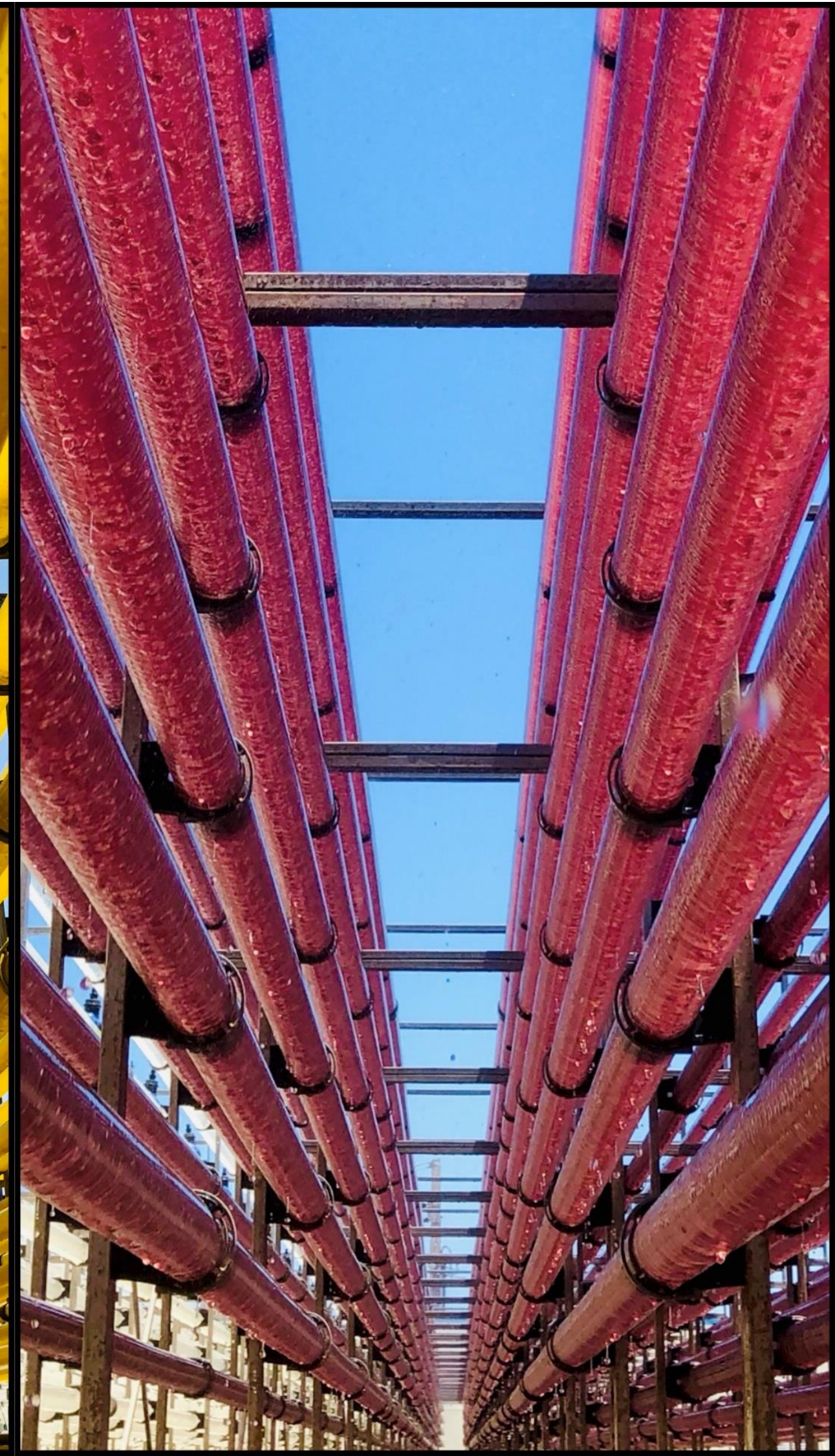


20 jueves / octubre
2022

Requerimientos nutricionales de rotíferos ainda por comprender!

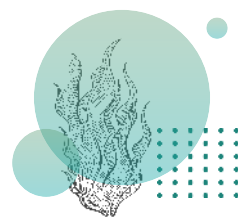


O desenvolvimento biotecnológico levou á disponibilidade de uma grande variedade de espécies de microalgas disponíveis no mercado

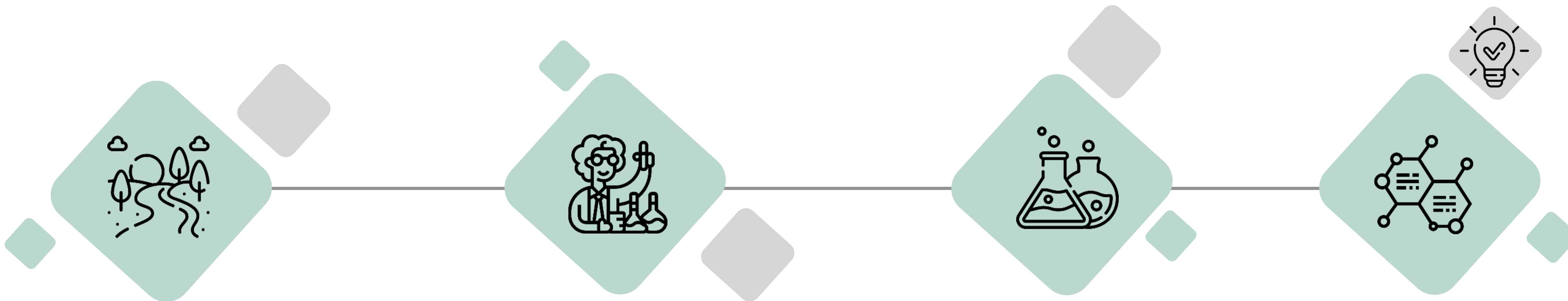


Estas novas espécies de microalgas podem ser valiosas em cultivo de alimento vivo e larvicultura uma vez que apresentam propriedades (e.g. imunomodeladoras e antioxidantes) importantes





Novas tendências em alimento vivo

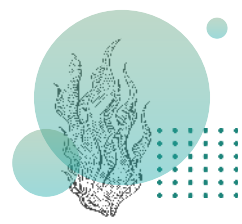


Nutrição de rotíferos

Nutrição e enriquecimento de alimento vivo com espécies de microalgas inovadoras (vivas)

Nutrição e enriquecimento de alimento vivo com Misturas de microalgas (formulações com microalgas produzidas industrialmente)

Formulações para nutrição e enriquecimento de alimento vivo que colmatem desafios colaterais que impactam o alimento vivo e larvicultura (e.g. qualidade da água, microbioma dos animais e água etc)



Manutenção da
qualidade da
água

Dosagens de
produtos

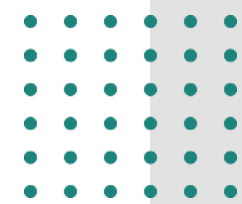
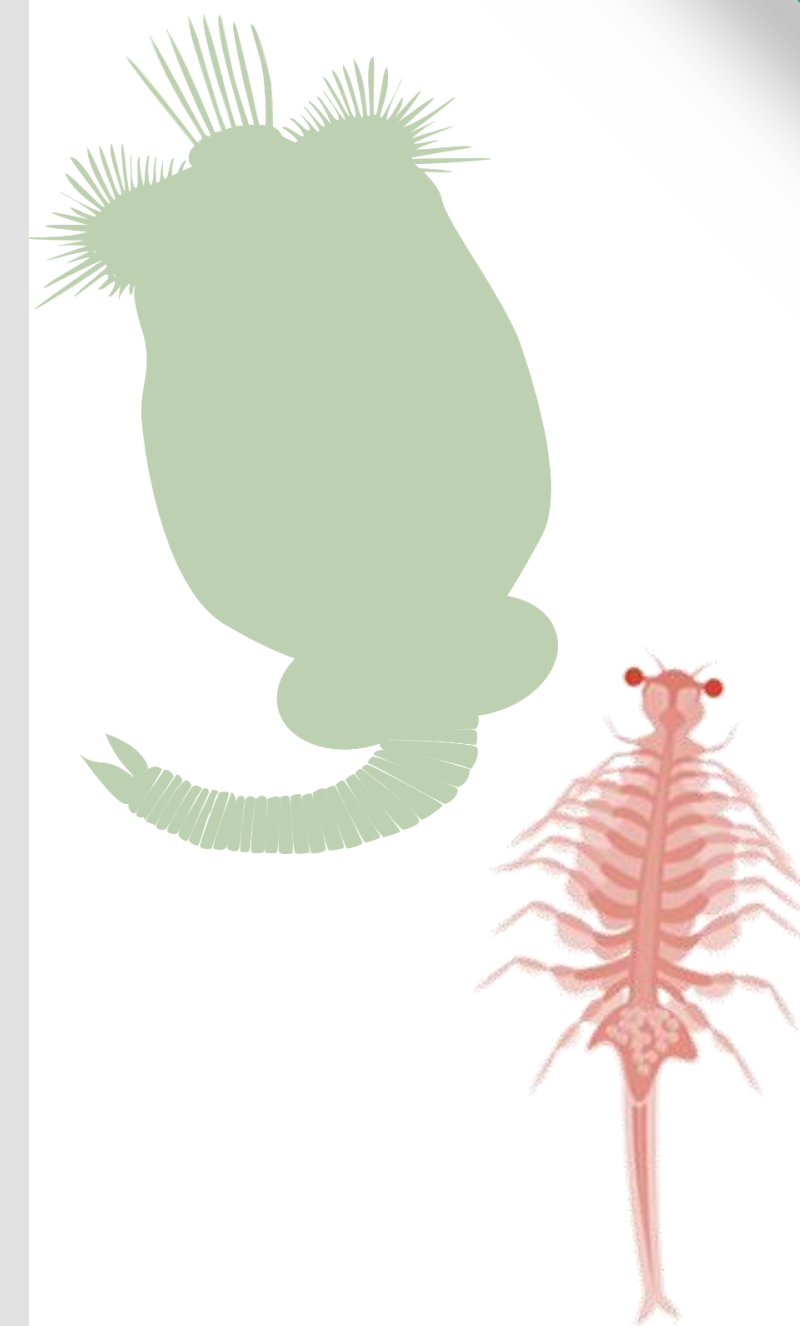
Dinâmica do
produto durante
aplicação

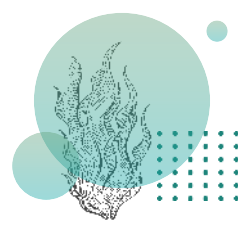
Compreensão do
metabolismo do
alimento vivo

Compreensão de
requerimentos
nutricionais

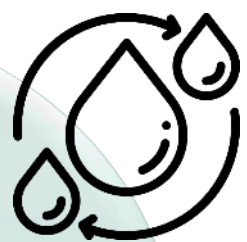
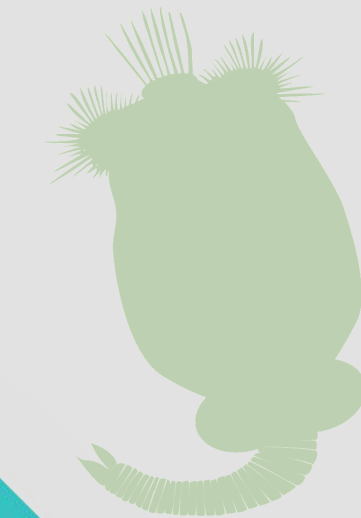
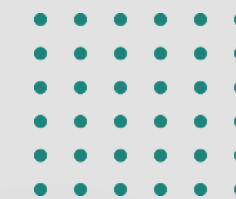
Manutenção de
microbioma
saudável

Desafios em nutrição e enriquecimento de alimento vivo





Desafios em nutrição e enriquecimento de alimento vivo



Manutenção da qualidade da água

Aos 3mg/L de amónia a reprodução é inibida

Aos 5mg/L de amónia a população colapsa em 2 dias

Shluter and Groneweg 1985

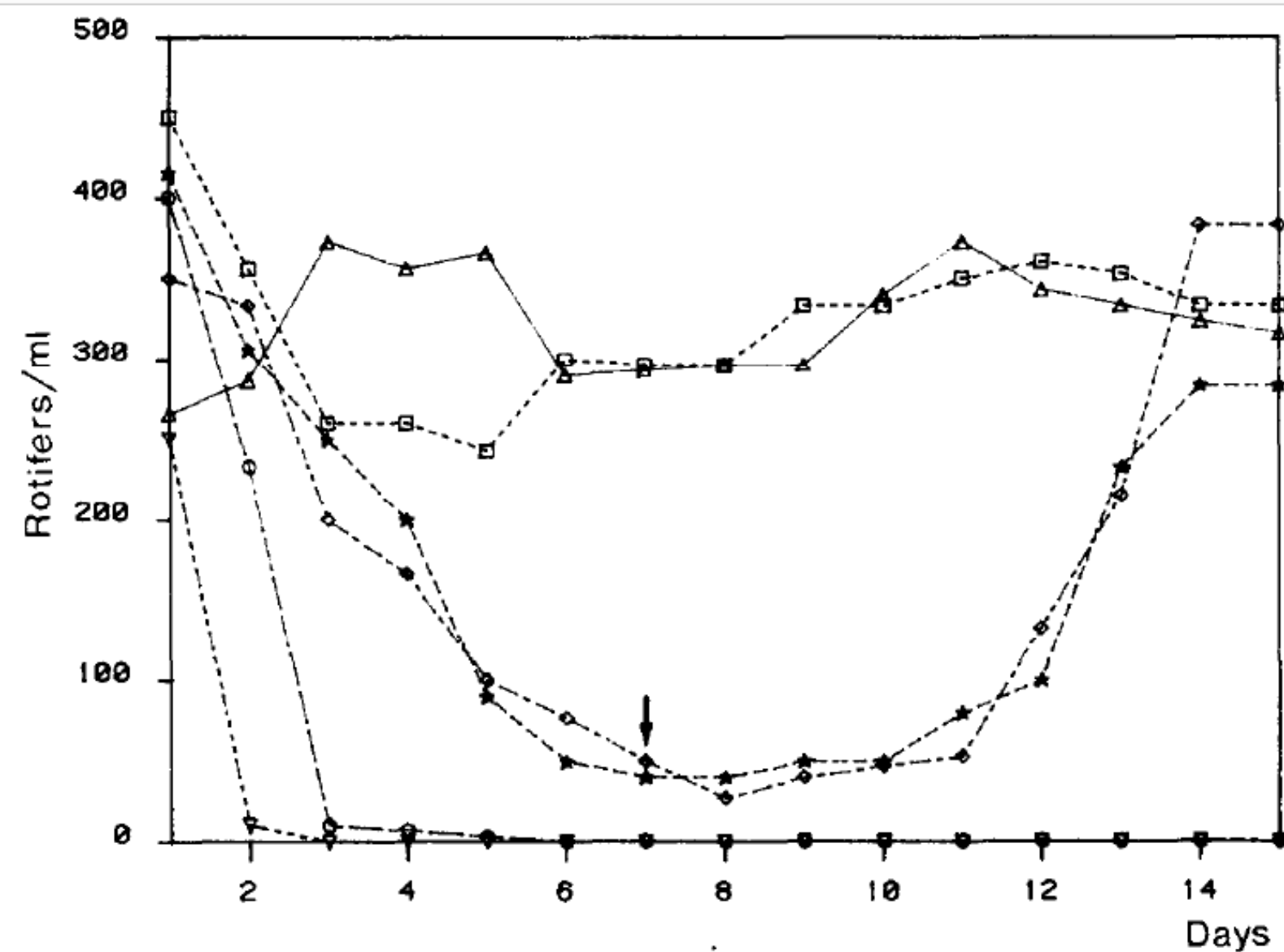


Fig. 1. Ammonia toxicity to *B. rubens* at pH 7.0–7.4. Kinetics of the rotifer density in continuous culture.

△ control, pH 7.40
 ◇ 627 mg NH₄⁺-N/l, pH 7.23
 ○ 872 mg NH₄⁺-N/l, pH 7.17
 → last addition of ammonium.
 □ 276 mg NH₄⁺-N/l, pH 7.36
 ★ 780 mg NH₄⁺-N/l, pH 7.02
 ▽ 1388 mg NH₄⁺-N/l, pH 7.00

Yu and Hirayama 1986

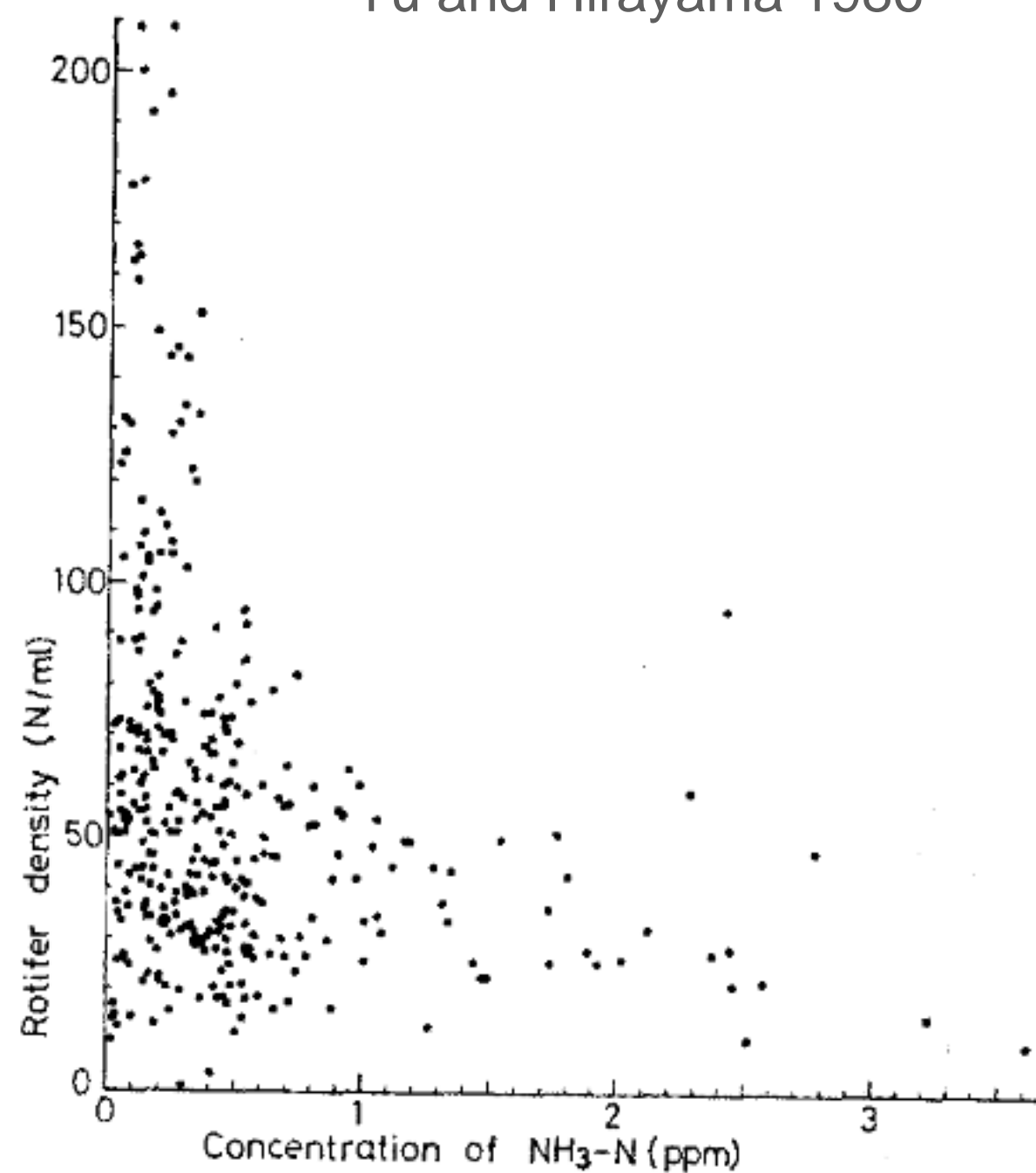
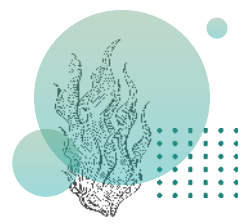
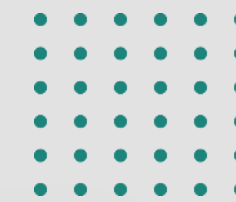


Fig. 1. Relationship between rotifer density and the concentration of un-ionized ammonia nitrogen in mass culture tanks (n=329).



20 jueves / octubre
2022

Desafios em nutrição e enriquecimento de alimento vivo



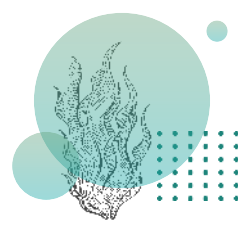
Dosagens do
produto

Estudos limitados ou inexistentes de dosagens de produtos de microalgas para enriquecimento

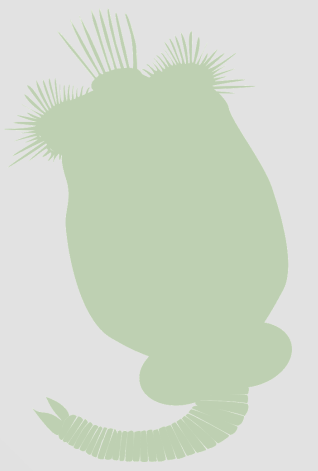
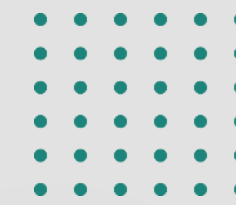
Há estudos de doses de nutrientes adicionados ao enriquecimento, no entanto a maior parte não valida em larvicultura

Há estudos que determinam o numero de células de microalgas vivas a utilizar em enriquecimento, no entanto as doses de microalgas vivas diferem das doses necessárias em produtos de microalgas comerciais

A eficiência de um produto de microalgas depende diretamente da sua adequada dosagem



Desafios em nutrição e enriquecimento de alimento vivo



Dosagens do produto



OPTIMIZATION OF ROTIFERS FEEDING PROTOCOL WITH *Nannochloropsis* sp. (PHYTOBLOOM® GREEN FORMULA)

Gonçalo Bastos¹, Flamiano Martins², Daniel Afonso², Alexandre Rodrigues¹, Victória del Pino¹, João Navalho¹ and Patrícia Diogo^{1*}

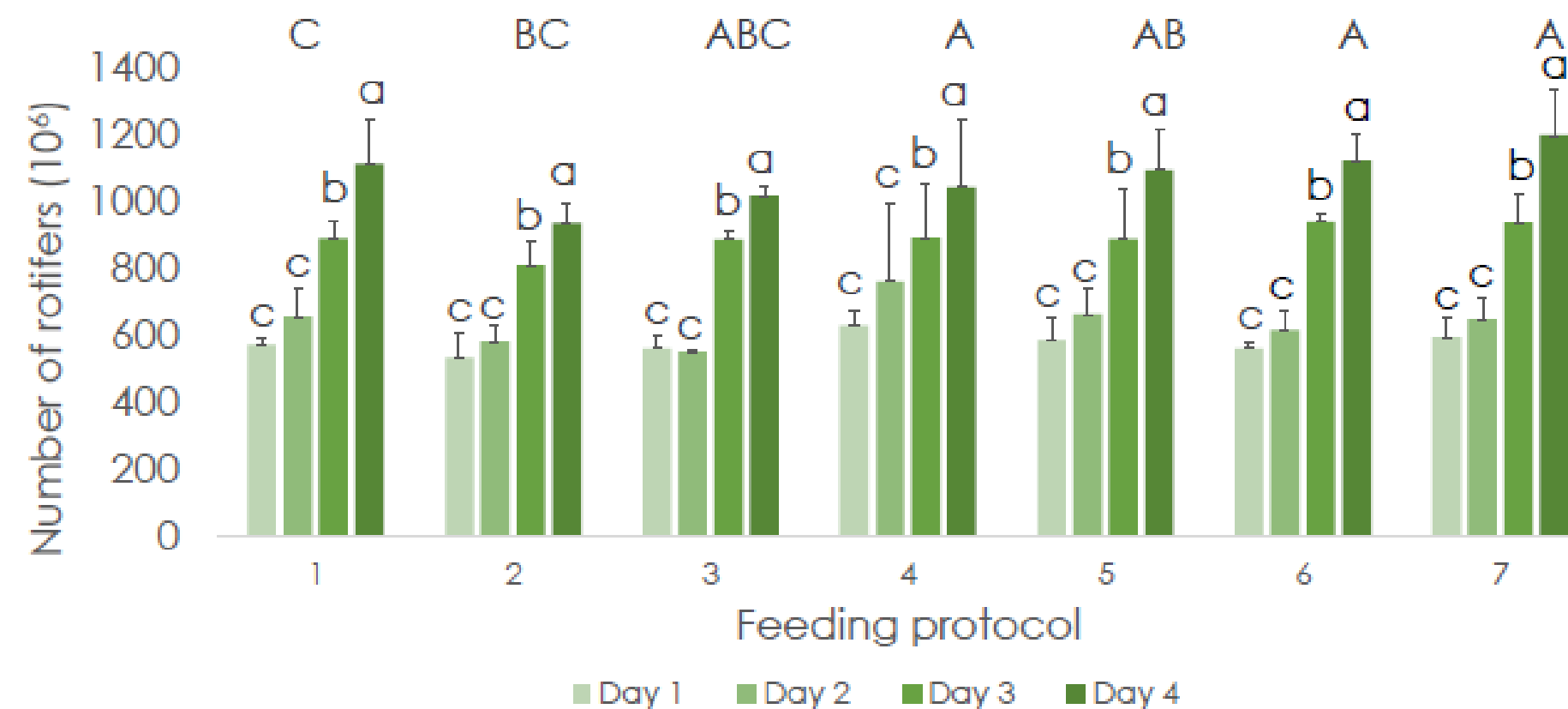
¹ Necton, S.A., Olhão, Portugal,
² FLATLANTIC - Seastainable Flatfish Village, Mira, Portugal,
* Correspondence: patricia.diogo@necton.pt

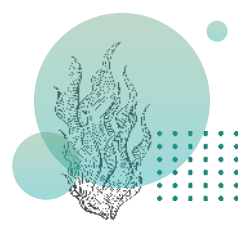
necton



Table 1- Dietary protocols applied in rotifers culture under batch production mode with *Nannochloropsis* sp. liquid concentrate (Phytobloom® Green formula).

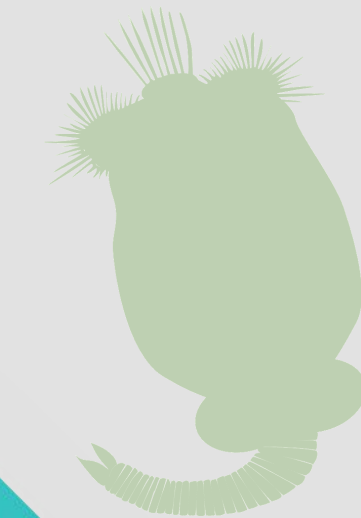
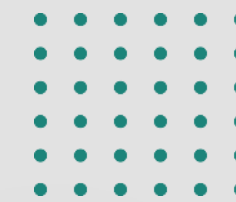
Feeding protocol	Daily dosage of <i>Nannochloropsis</i> sp. liquid concentrate per million of rotifers				Number of batches of 4 days
	Day 1	Day 2	Day 3	Day 4	
1	3.0 mL	1.5 mL	1.5 mL	1.5 mL	3
2	3.0 mL	2.0 mL	1.5 mL	1.5 mL	3
3	3.0 mL	1.7 mL	1.7 mL	1.7 mL	2
4	3.2 mL	2.3 mL	2.3 mL	2.3 mL	6
5	3.2 mL	2.4 mL	2.4 mL	2.4 mL	6
6	3.2 mL	2.5 mL	2.5 mL	2.5 mL	4
7	3.2 mL	2.6 mL	2.6 mL	2.6 mL	8





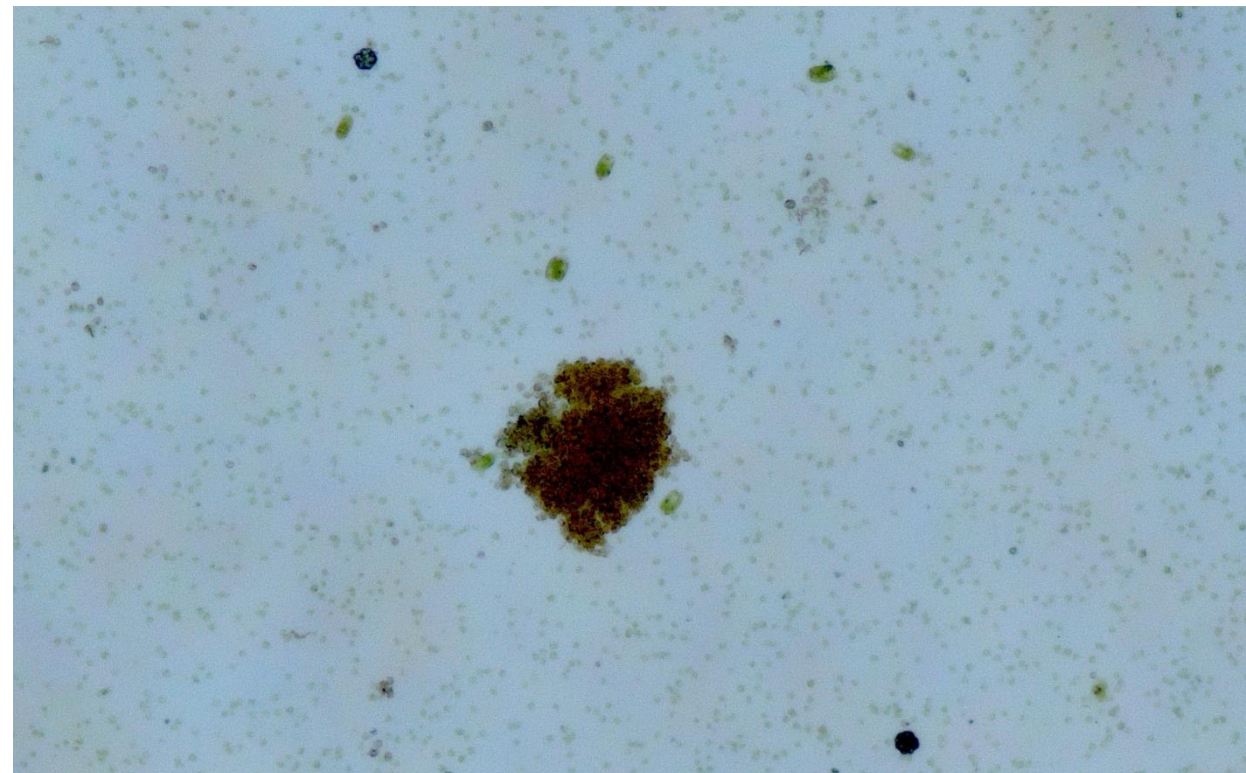
20 jueves / octubre 2022

Desafios em nutrição e enriquecimento de alimento vivo



Dinâmica do produto durante aplicação

Aglomeración



Formação de espuma



Precipitação

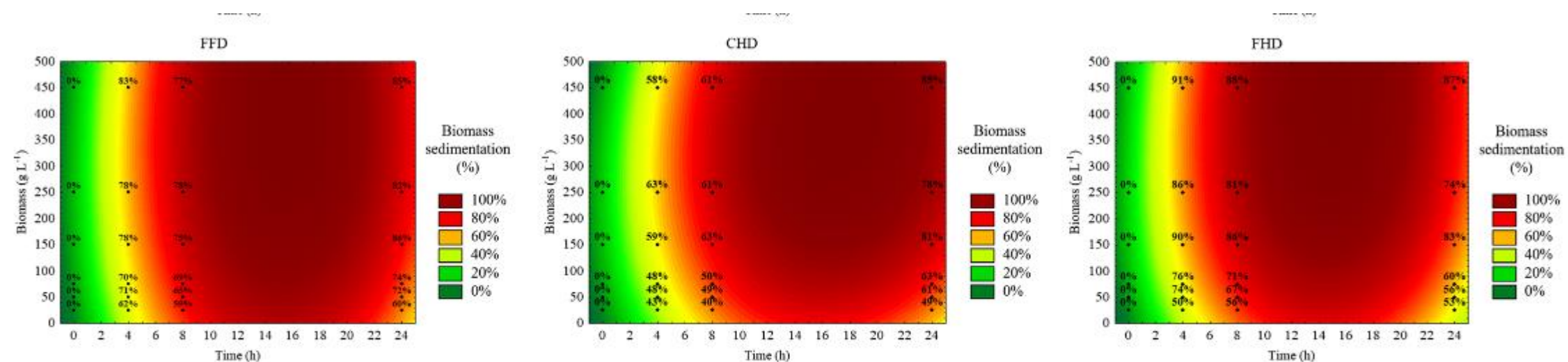
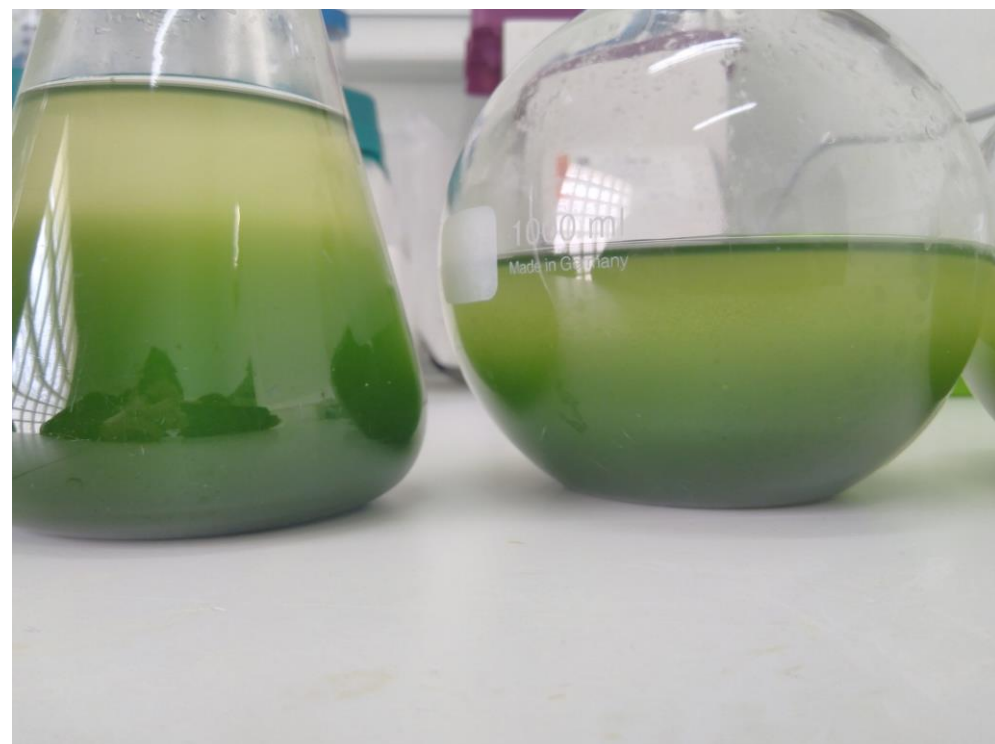
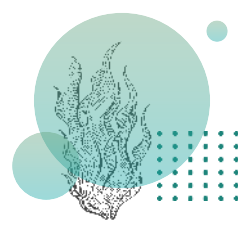
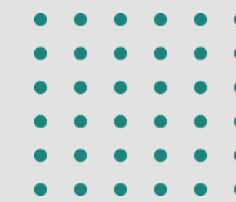


Fig. 1 Sedimentation profile of the microalgae diets *Nannochloropsis oculata* in relation to the concentration of biomass (g L⁻¹) in 24 h. CCH centrifuged chilled, CFR centrifuged frozen, CFD centrifuged freeze-dried, CHD centrifuged heat-dried, FCH flocculated chilled, FFR flocculated frozen, FFD flocculated freeze-dried, FHD flocculated heat-dried, FMC fresh microalgae culture

Estes problemas encontram-se bem identificados em aquacultura no entanto não são abordados pelos formuladores ou em investigação



Desafios em nutrição e enriquecimento de alimento vivo



Compreensão do metabolismo do alimento vivo

Para realizar uma boa formulação de enriquecimento é necessário compreender os requerimentos nutricionais das larvas de peixes marinhos

Table 1 Basic levels of macronutrients, vitamins and minerals in unenriched rotifers, *Artemia* nauplii (EG-type, Great Salt Lake UT, USA, INVE Aquaculture) ongrown *Artemia* and zooplankton, mainly copepods, harvested from a fertilized seawater pond in western Norway (Svartatjønn). The ranges of requirements in juvenile and adult fish given by NRC (2011) are listed for comparison

	Rotifers†	<i>Artemia</i> ‡	Ongrown <i>Artemia</i> ‡	Copepods§	NRC (2011)
Macronutrients (g kg⁻¹ DM)					
Total amino acids (TAA)	396 ± 12	471–503	596 ± 59	634 ± 89	–
Nitrogen	89 ± 2	85–102	101 ± 10	119 ± 5	–
Protein/nitrogen factor	4.46	4.95–5.57	5.79 ± 0.85	5.30 ± 0.44	–
Soluble AA (% of TAA)	44–61¶	54 ± 4¶	na	na	–
FAA (% of TAA)	5–7	9–10	na	12–13	–
Lipid (TL)	95–110	102	178 ± 34	156 ± 31	–
PL (% TL)	34	31	33 ± 2	50 ± 12	–
NL (% TL)	66	69	67 ± 2	50 ± 12	–
Total fatty acids	90 ± 21	119	84 ± 8	na	–
Glycogen	na	74–96	21 ± 1	5 ± 2	–
Ash	96	90	197 ± 12	95–104	–
Vitamins (mg kg⁻¹ DM)					
Vitamin C	117–190	798	400–1000	500	50
Riboflavin	22–44	37	27–60	14–27	4–7
Thiamine (B1)	2.0–57	4.2	3–12	13–23	1
Folic acid	4.0–57	14	6–11	3–5	1
Pyridoxine (B6)	20–25	28	2–33	2–6	3–6
Biotin	1.6–1.8	4.5	2–5	0.6–0.9	0.15–1
Cobalamin (B12)	23–43	0.00	2–5	1–2	0.02
Niacin	191–249	159	160–250	100–150	10–28
Vitamin E	85–294	70	64–500	110	50
Carotenoids	24	630–750	650–750	630–750	–
Vitamin A	0.00	0.00	0.00	0	0.75
Minerals (g kg⁻¹ DM)					
Phosphorus	9.4 ± 0.7	12–19	na	12.4–15.0	3–8
Calcium	1.9 ± 0.2	1.9–2.0	na	1.1–2.4	nd
Magnesium	4.8 ± 0.5	2.0–5.0	na	2.4–3.1	0.4–0.6
Minerals (mg kg⁻¹ DM)					
Iodine	3.2–7.9	0.5–4.6	2.2 ± 0.4	50–350	0.6–1.1
Manganese	3.9–5.1	4–30	na	8–25	2–12
Copper	2.7–3.1	7–40	na	12–38	3–5
Zinc	62–64	120–310	na	340–570	15–37
Selenium	0.08–0.09	2.2	na	3–5	0.15–0.25
Iron	84–114	63–130	na	85–371	30–150

na, not analysed; nd, not determined.

†The rotifers were grown on yeast and cod liver oil, yeast and Algamac™ (Aquafauna Bio-marine, Inc., CA, USA) or yeast and Chlorella (Chlorella Industry Co. Ltd, Tokyo, Japan) for 4 days. Data from Srivastava *et al.* (2006), van der Meeren *et al.* (2008) and Hamre *et al.* (2008b).

‡The *Artemia* were either newly hatched or grown on micronized fish meal for 4 days after hatching. Data from Hamre *et al.* (2002, 2007), van der Meeren *et al.* (2008) and Hamre and Harboe, unpubl. data.

§Data on copepods are from Hamre *et al.* 2005, 2008b and Benneker *et al.* 1995

Hamre et al. 2013

Desafios em nutrição e enriquecimento de alimento vivo



Compreensão do metabolismo do alimento vivo



In vivo biosynthesis of long-chain polyunsaturated fatty acids by the euryhaline rotifer (*Brachionus plicatilis*)

José A. Pérez^{a,*}, Diana B. Reis^{a,1}, Daniel Ramírez^a, Nieves G. Acosta^a, Roberto Dorta-Guerra^b, Salvador Jerez^c, Covadonga Rodríguez^a



Effect of *Artemia* inherent fatty acid metabolism on the bioavailability of essential fatty acids for *Octopus vulgaris* paralarvae development

Diana B. Reis^{a,b,*}, Nieves G. Acosta^a, Eduardo Almansa^c, Diego Garrido^c, José P. Andrade^b, António V. Sykes^b, Covadonga Rodríguez^a

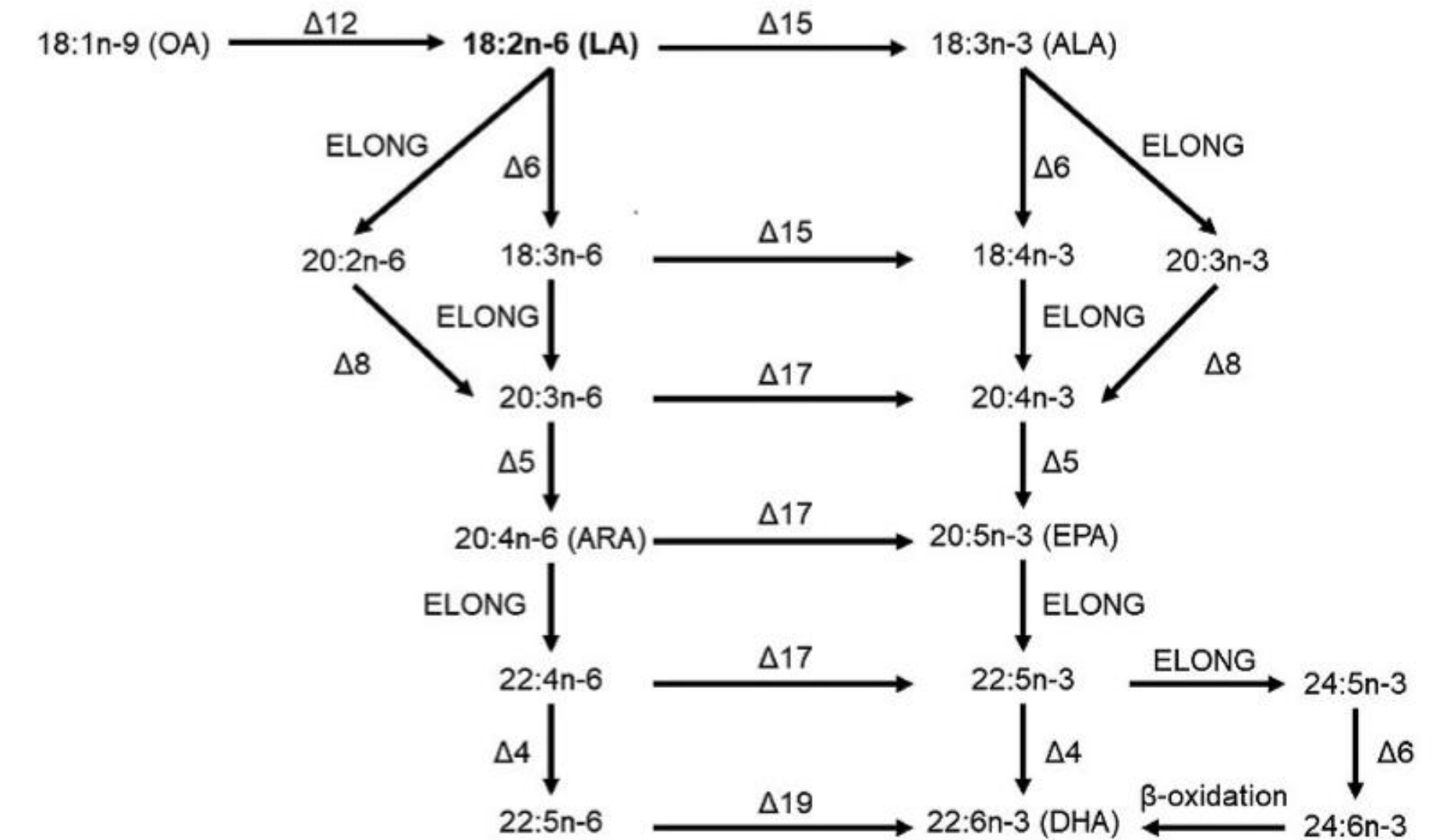
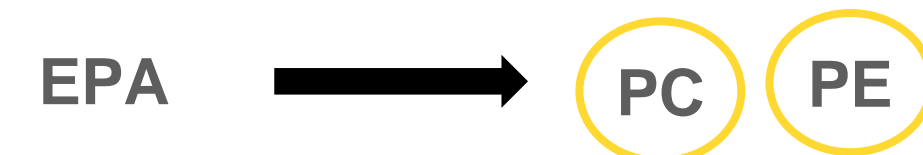
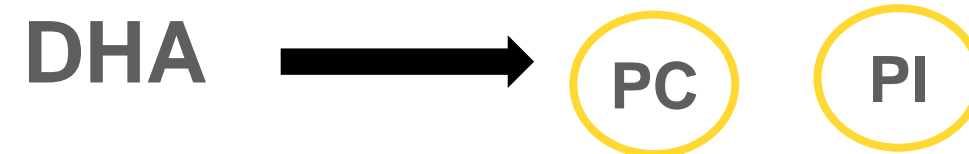
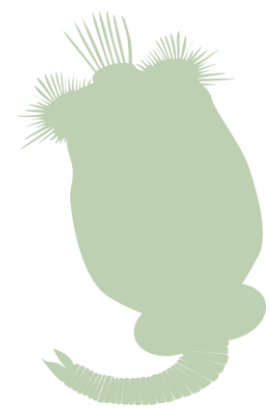
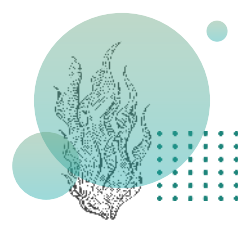


Fig. 1.. Possible biosynthetic pathway of long-chain polyunsaturated fatty acids in the rotifer *Brachionus plicatilis*. ELONG, elongases.

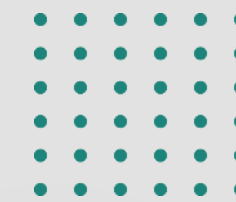
The best way to provide LC-PUFAS to marine fish larvae is through PL. In this way rotifers can be considered as an appropriate vehicle as its preferential esterification of these fatty acids (LC-PUFAS) is to PL. DHA is mainly esterified in two products in rotifers: PC and PI. This meets the requirements of marine fish larvae. It's important to highlight that there is competition between DHA and PUFAS 18C could result in inadequate levels of DHA

- DHA competitividade com PUFAS 18C e o equilíbrio final pode ser inadequado para as larvas
- A artémia não é o melhor veículo para DHA



20 jueves / octubre 2022



Desafios em nutrição e enriquecimento de alimento vivo



Compreensão de requerimentos nutricionais

Contents lists available at ScienceDirect

Electronic Journal of Biotechnology

Research article

Effect of *Brachionus rubens* on the growth characteristics of various species of microalgae



Reda A.I. Abou-Shanab ¹, Manjinder Singh ^{*}, Anangelica Rivera-Cruz, Grace Power, Thomas Bagby-Moon, Keshav Das

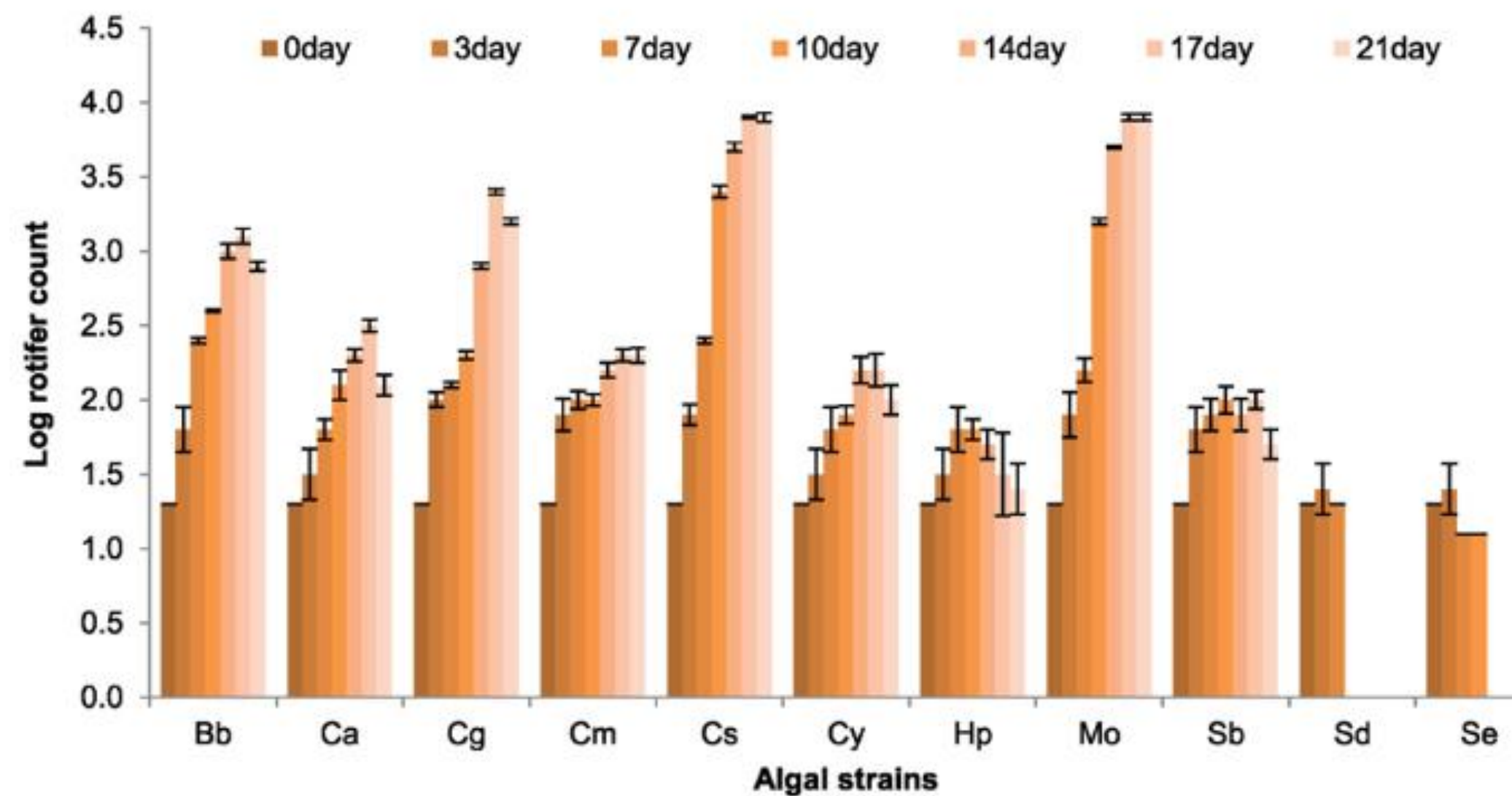
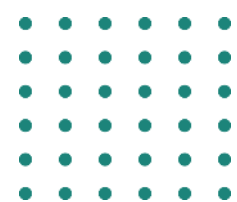
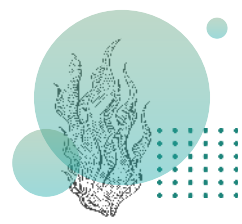


Fig. 3. Log rotifer count raised on different microalgae species at different cultivation time.





Desafios em nutrição e enriquecimento de alimento vivo

Compreensão de
requerimentos
nutricionais



Contents lists available at ScienceDirect

Aquaculture Reports

journal homepage: www.elsevier.com/locate/aqrep



Rotifers enriched with a mixed algal diet promote survival, growth and development of barramundi larvae, *Lates calcarifer* (Bloch)



Valentin Thépot^{a,*}, Arnold Mangott^{a,b}, Igor Pirozzi^a

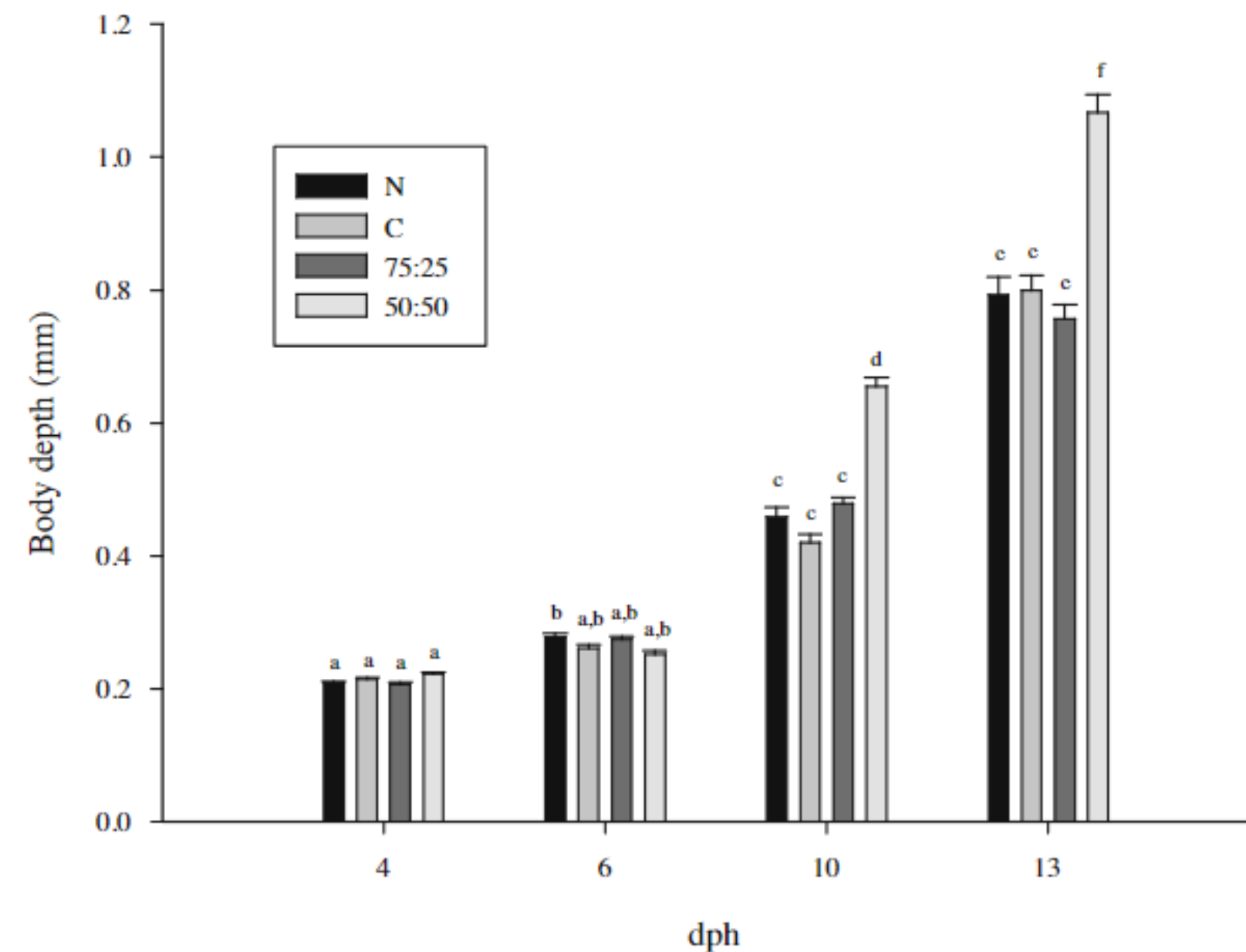
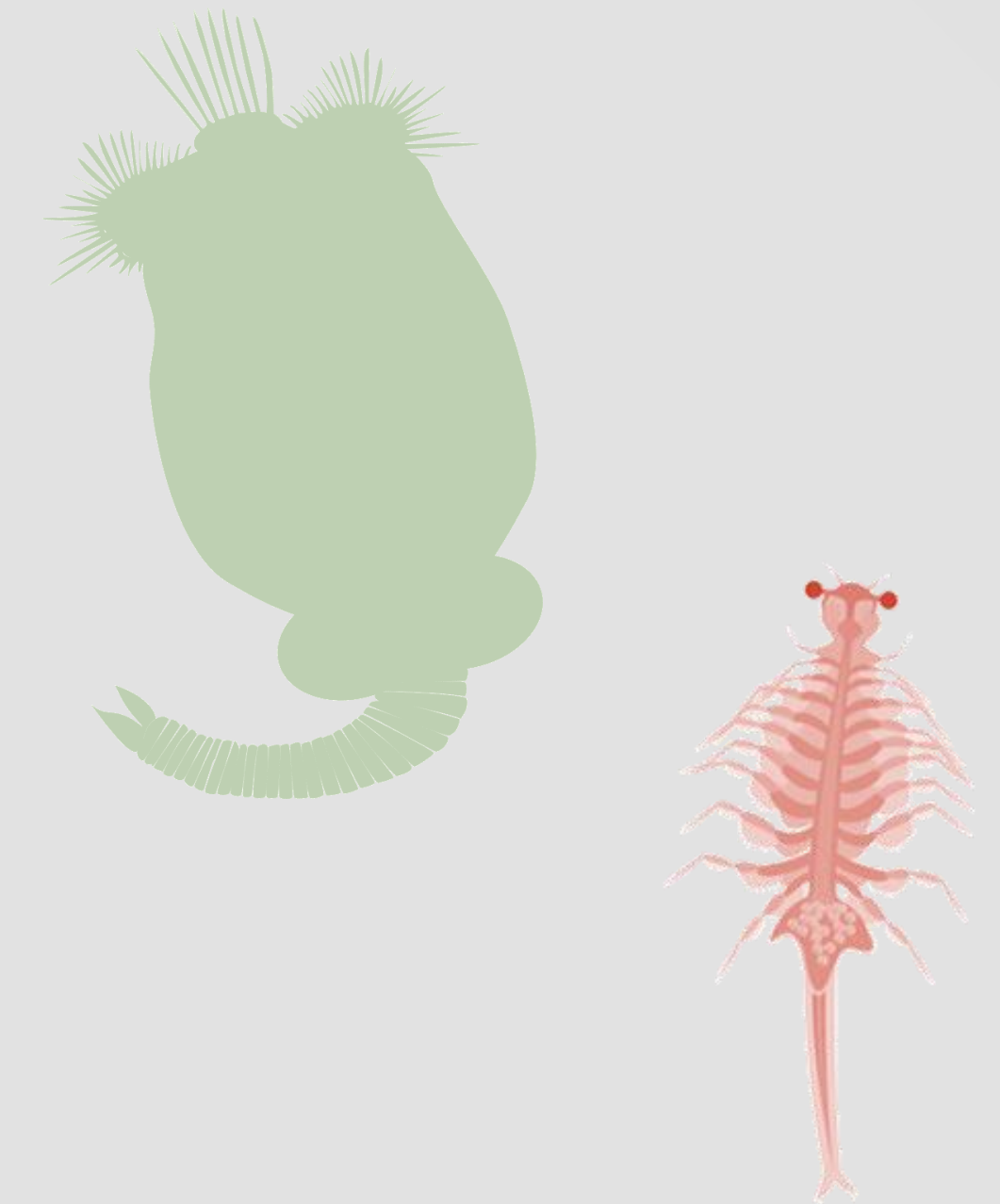
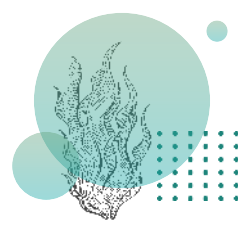


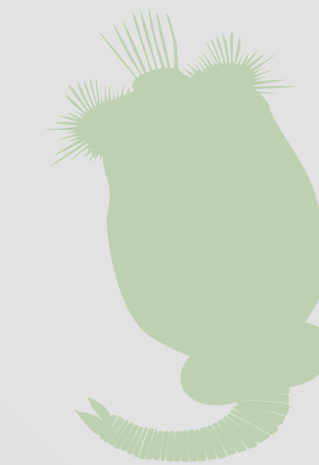
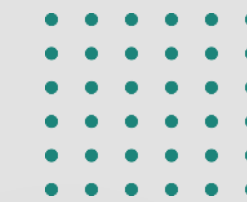
Fig. 4. Body depth of the 4, 6, 10 and 13 dph barramundi larvae fed the four diets where: N: *N. oculata*; C: *C. vulgaris*; 50:50 and 75:25 = proportional blends of *N. oculata* and *C. vulgaris* respectively (mean \pm SD; n = 150). Different letters denote significant differences ($P < 0.05$).





20 jueves / octubre
2022

Desafios em nutrição e enriquecimento de alimento vivo



Manutenção de
microbioma
saudável



FEMS

FEMS Microbiology Letters, 367, 2020, fnaa020

<https://doi.org/10.1093/femsle/fnaa020>

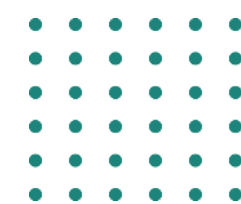
Advance Access Publication Date: 1 February 2020

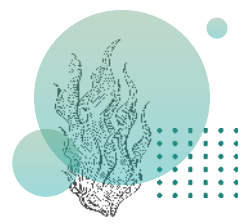
Research Letter

RESEARCH LETTER – Environmental Microbiology

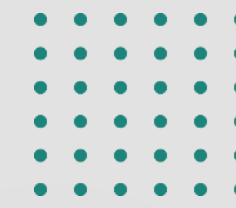
The influence of diet on the microbiota of live-feed rotifers (*Brachionus plicatilis*) used in commercial fish larviculture

Emre Turgay^{1,*†}, Terje Marken Steinum², Kamil Mert Eryalçın³,
Remziye Eda Yardımcı¹ and Süheyla Karataş¹





Desafios em nutrição e enriquecimento de alimento vivo



Manutenção de microbioma saudável



O perfil da microbioma dos rotíferos altera-se ao fim de 2 dias de alimentação com cada dieta

Microbioma principal: 31 sps bacterianas incluindo 3 espécies *Vibrio* sp.

A composição da microbiota dos rotíferos assemelha-se a invertrabdos marinhos e peixes (*Sparus aurata*) (Egerton et al 2018)

Identificados 10 espécies de bactérias potencialmente patógenas

Identificados 60 estirpes Roseobacter potencialmente benéficas pois são antagonistas de bactérias patogénicas e desnitrificantes

A maior parte das bactérias patogénicas é originaria dos stocks de rotíferos

A maior parte das bactérias patogénicas é originaria dos stocks de rotíferos

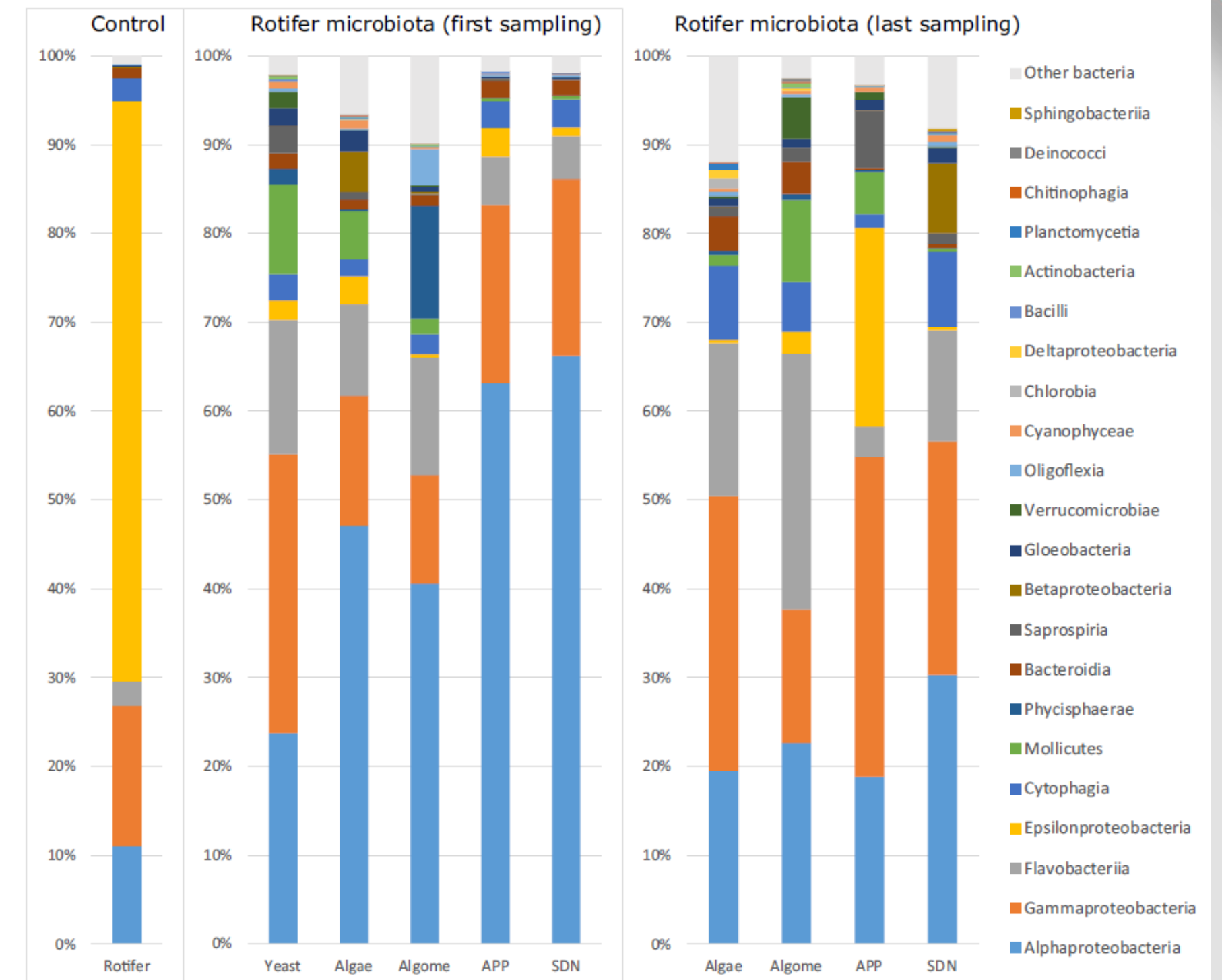
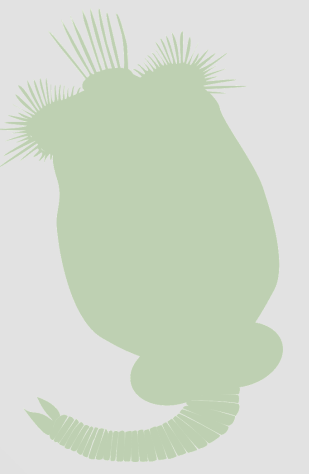
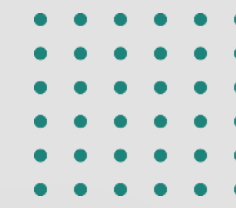
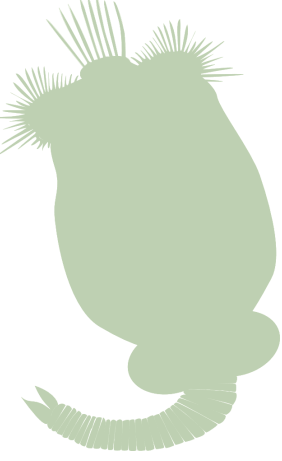


Figure 1. Stacked bar chart revealing the relative abundances of prevalent bacterial classes in rotifer (*Brachionus plicatilis*) samples after 16S rRNA-gene copy number adjustment of read counts. The bacterial class color legend reflects high to low abundance from the bottom up. Each stacked bar represent the median value of replicate rotifer samples taken from parallel tanks belonging to five different diet groups (Algae, Yeast, Algome, APP and SDN).

Desafios em nutrição e enriquecimento de alimento vivo



Manutenção de microbioma saudável



Planas et al 2004

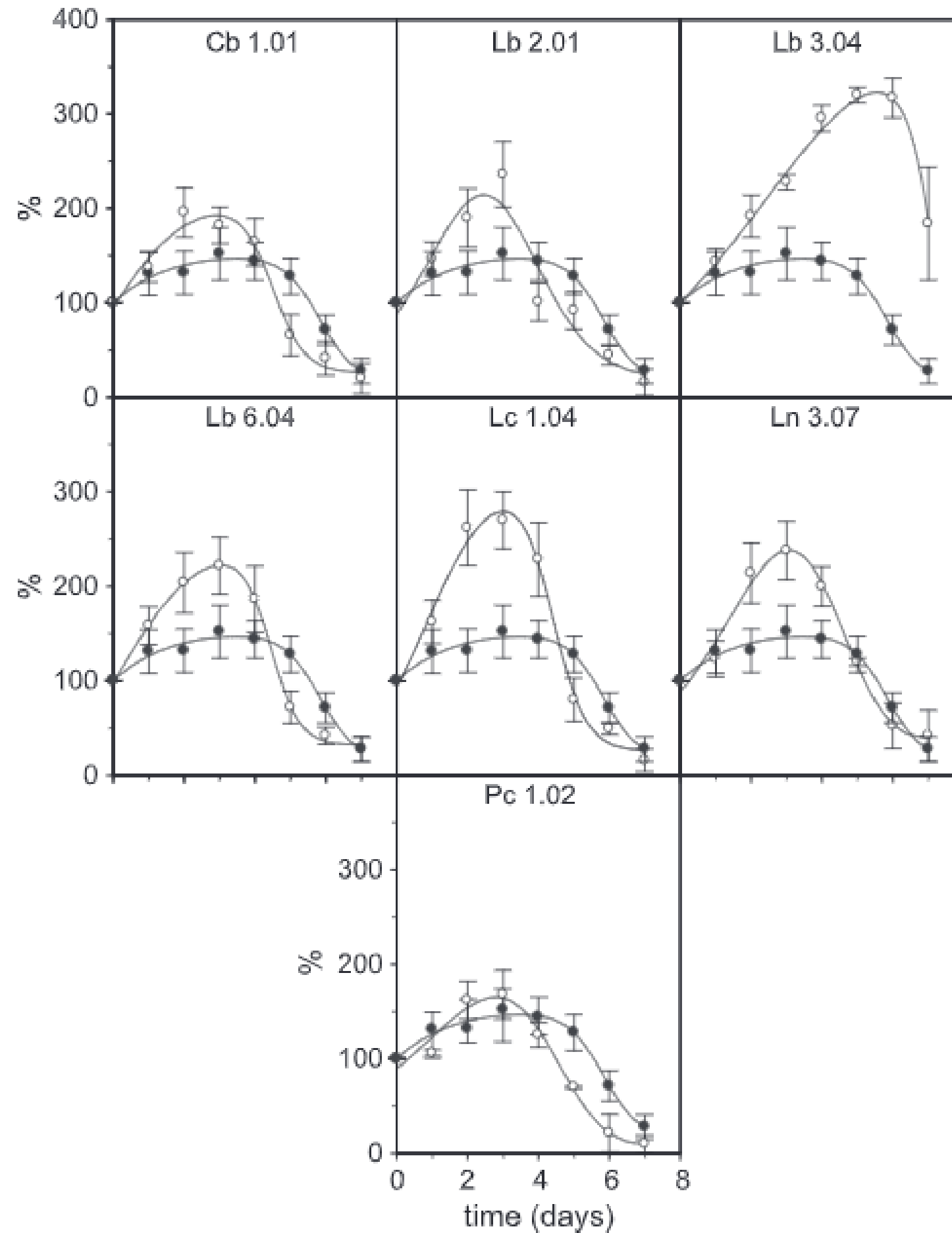


Fig. 2. Growth (percentage with respect to the initial density) of the rotifer *B. plicatilis* in the absence (●) or presence (○) of seven strains of lactic acid bacteria as reported in Table 3. Continuous line: fitting to Eq. (3).

Tarnecki et al 2019

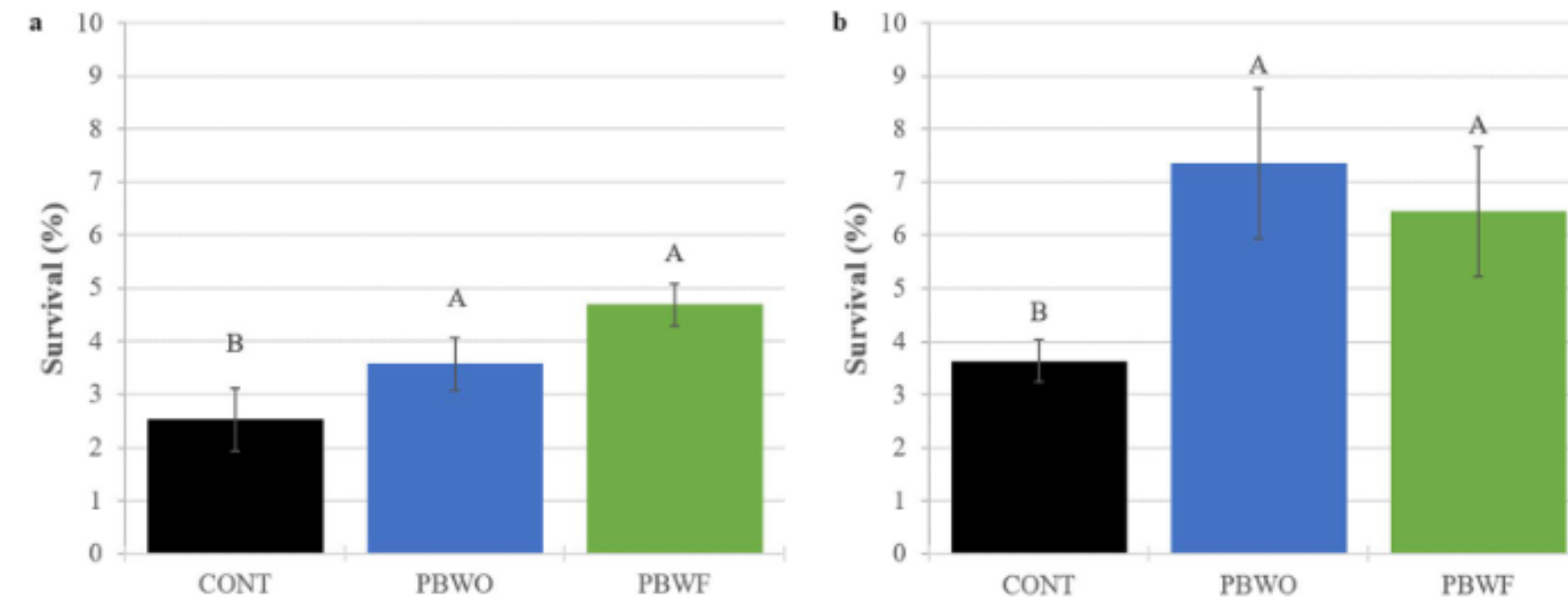


Figure 2. Percent survival (\pm SE) of common snook larvae treated with probiotics for 28 days (Trial 1) and 26 days (Trial 2). Letters denote significant differences ($p < 0.05$). (a) Trial 1; (b) Trial 2. CONT, control; PBWO, probiotics in water only; PBWF, probiotics in water and live feed.

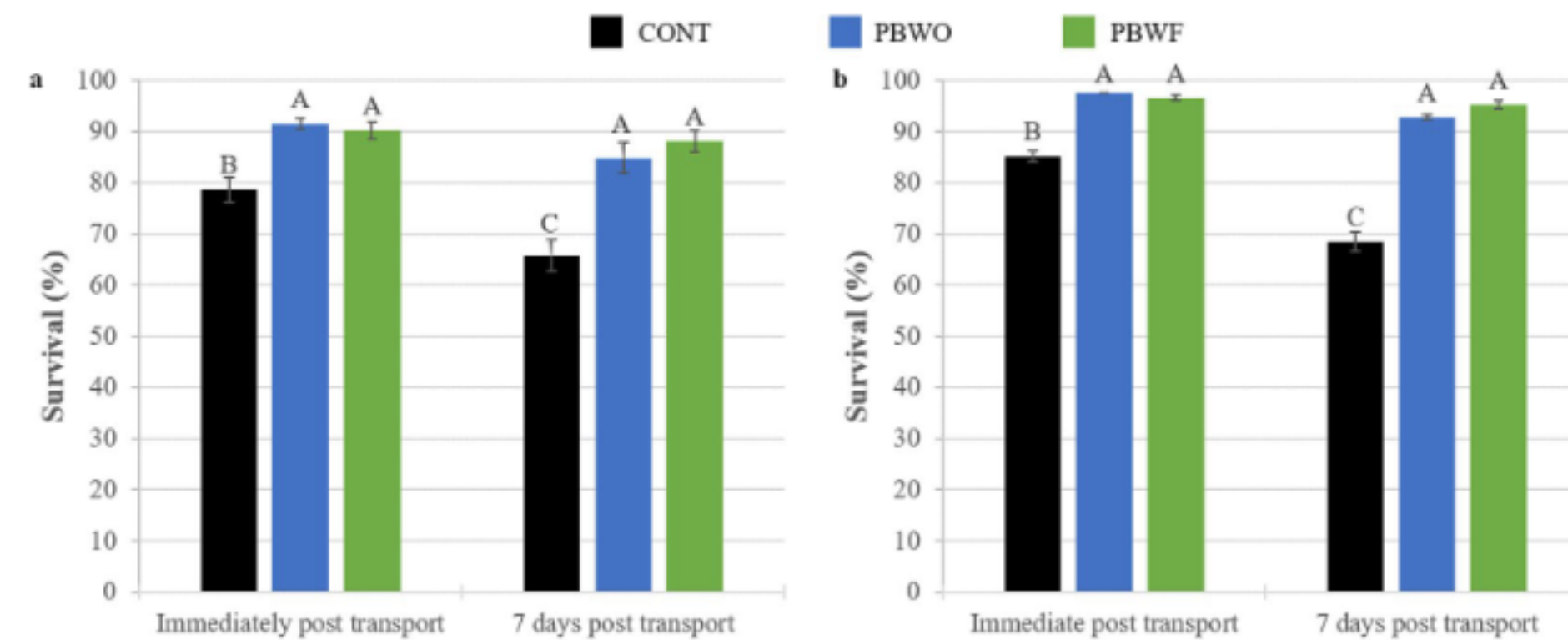
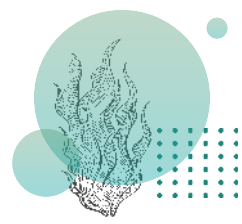


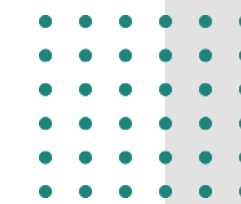
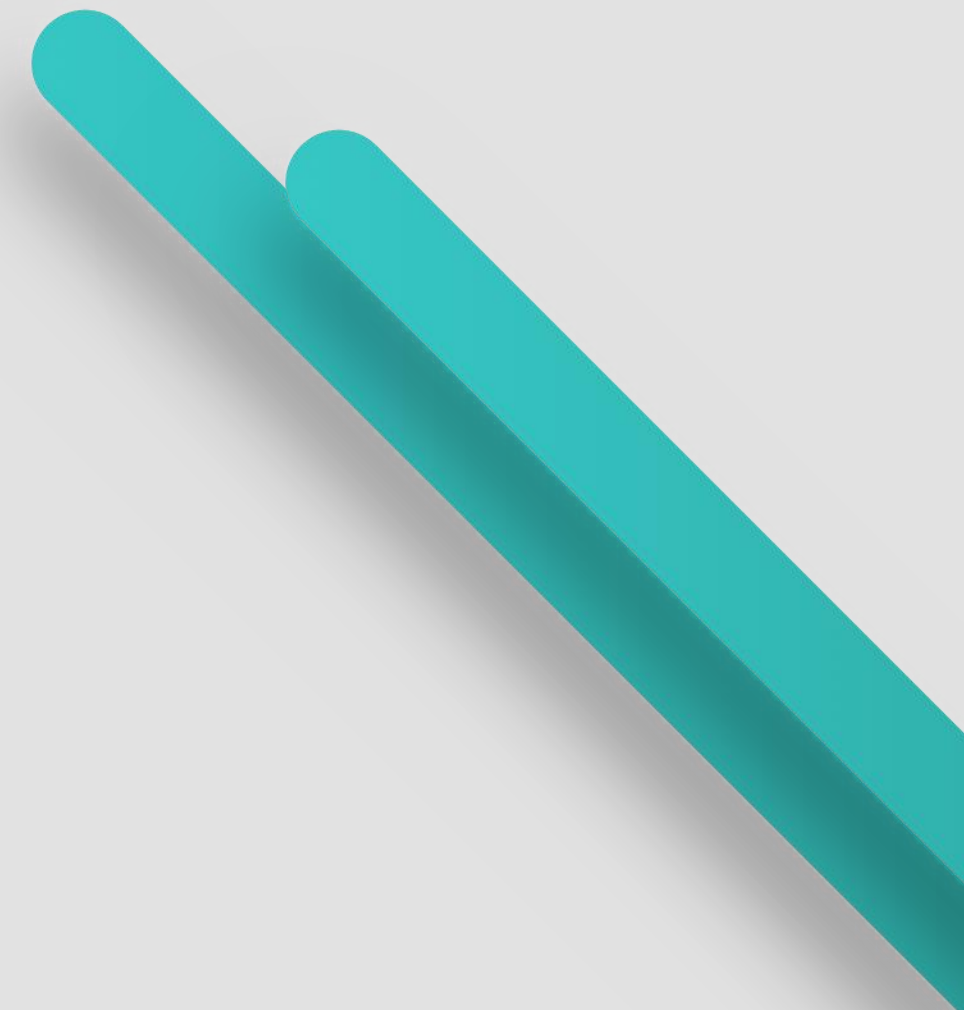
Figure 3. Percent survival (\pm SE) of common snook larvae after transport following experimental probiotics trials. Letters denote significant differences ($p < 0.05$). (a) Trial 1; (b) Trial 2. CONT, control; PBWO, probiotics in water only; PBWF, probiotics in water and live feed.



20 jueves / octubre
2022



Projetos de investigação



Projetos de inovação na Necton

NATIONAL

“Noalgas” “Carotenoides”
 “Aqualgas” “Biorecicla” “Overcaroten” “Antiviral” “Botryofuel” “Greendiets”



INTERNATIONAL

“Carotenoids” “Alginet”
 “Astaxanthin” “Pufatech” “Phagevet-P”
 “Pufafeed”



Currently:

10 ongoing projects:
 - 5 European projects
 - 5 national projects
 - Leaders in 4 projects

Part of 2 Colaborative laboratories:
 - S2aquaColab
 - GreenColab

Desenvolvimento de novos produtos na Necton

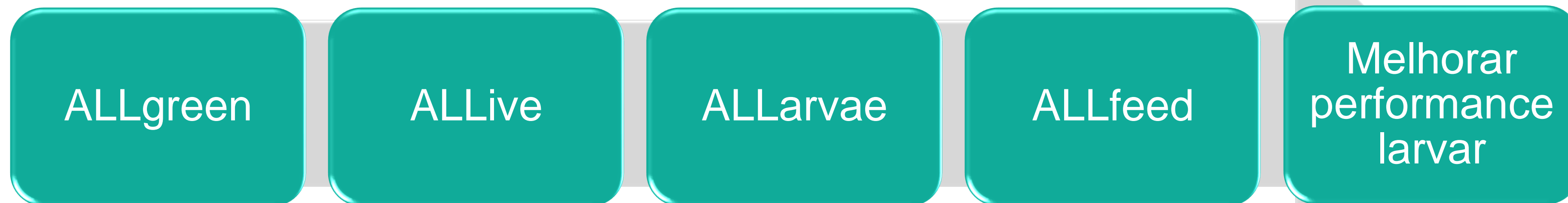


ALLARVAE

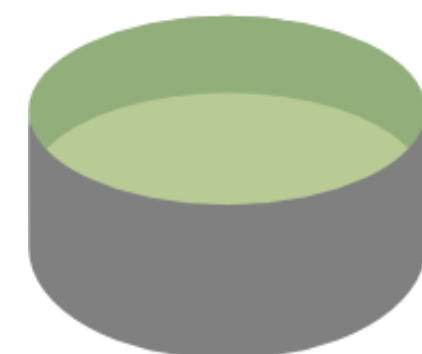
New formulations with microalgae for marine larviculture



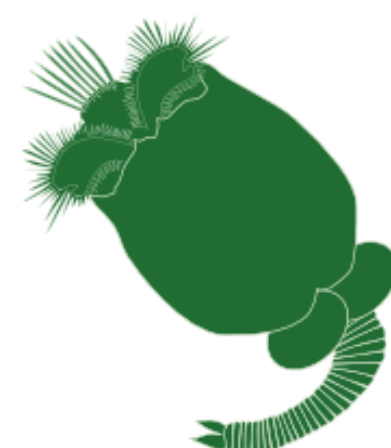
ALLARVAE



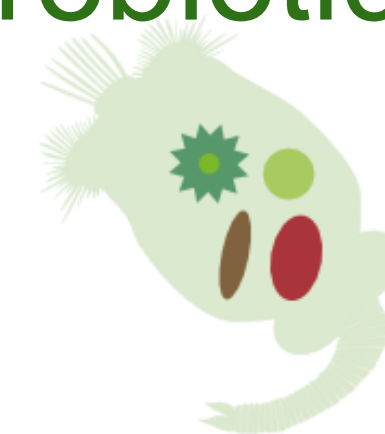
Microalgae
+
Probiotics



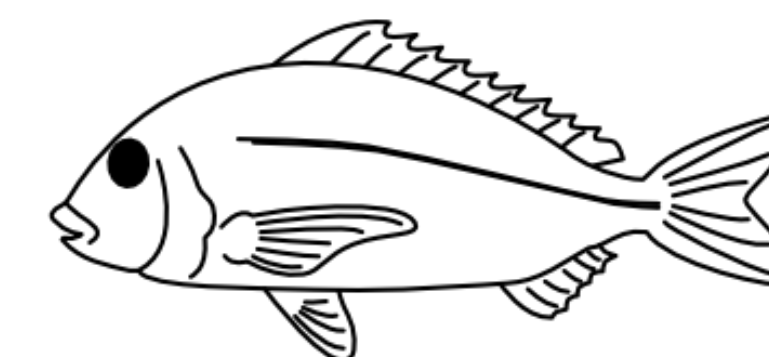
Microalgae
+
Probiotics



Microalgae
+
Probiotics



Microalgae
hidrolisates



necton

ALLARVAE ALG-01-0247-FEDER-069971



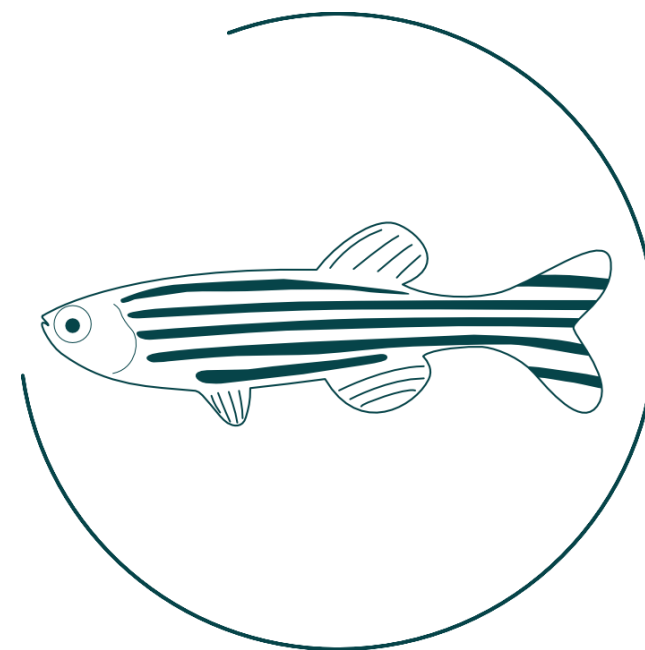
Desenvolvimento de novos produtos

ZEBRABLOOM

DEVELOPMENT OF COMMERCIAL PRODUCTS FORMULATED WITH MICROALGAE FOR THE ENRICHMENT OF LIVE ZEBRA FISH PREY



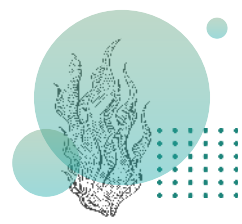
Desenvolvimento de misturas de microalgas para bioencapsulação de rotíferos para nutrição de larvas



Desenvolvimento de misturas de microalgas para bioencapsulação de rotíferos para nutrição de reprodutores



Otimização do cultivo de rotíferos nas condições presentes nas instalações de peixe zebra

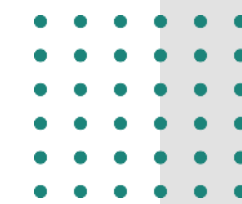
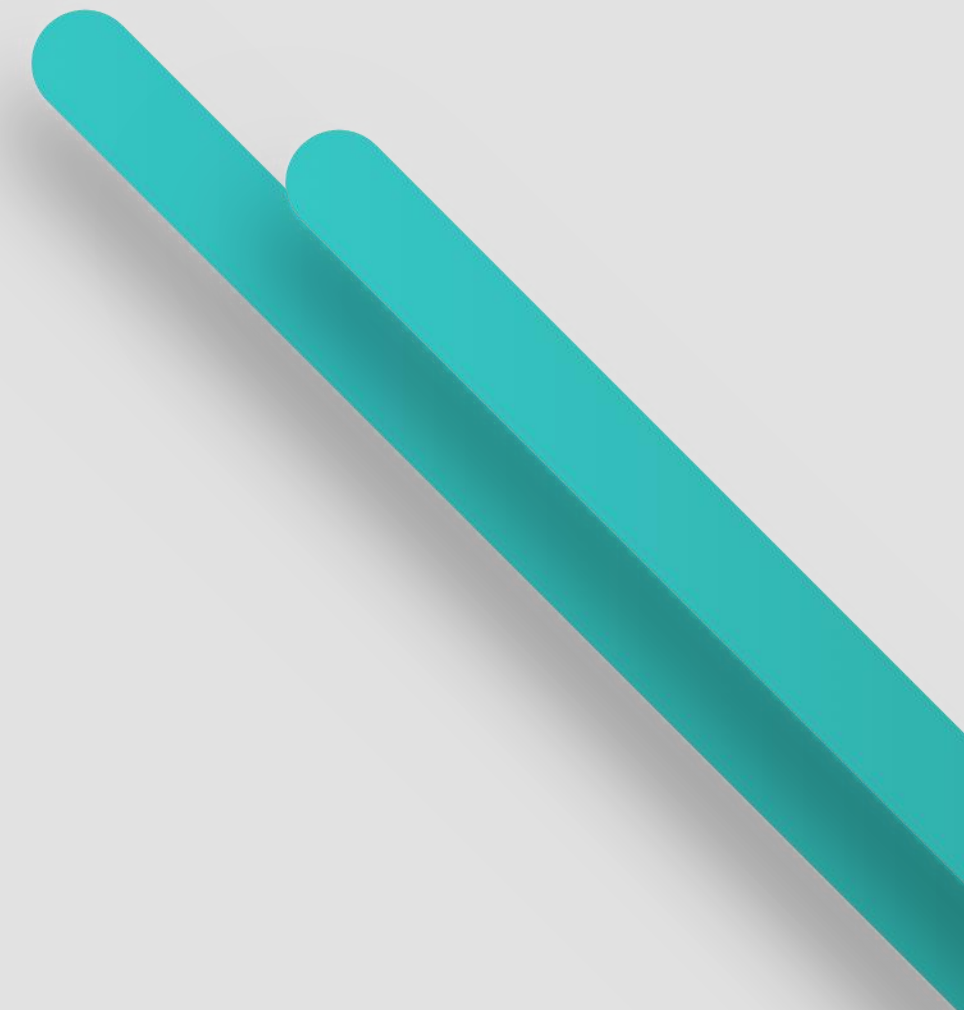


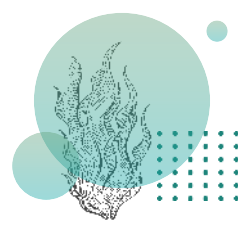
20 jueves / octubre
2022



PRODUCT DEVELOPMENT

Desenvolvimento de novos produtos na Necton para rotíferos Em 2022





20 jueves / octubre 2022

Phytobloom® ELITE formula

aquaculture europe 22

Rimini - Italy
27-30 september

eas
european aquaculture society

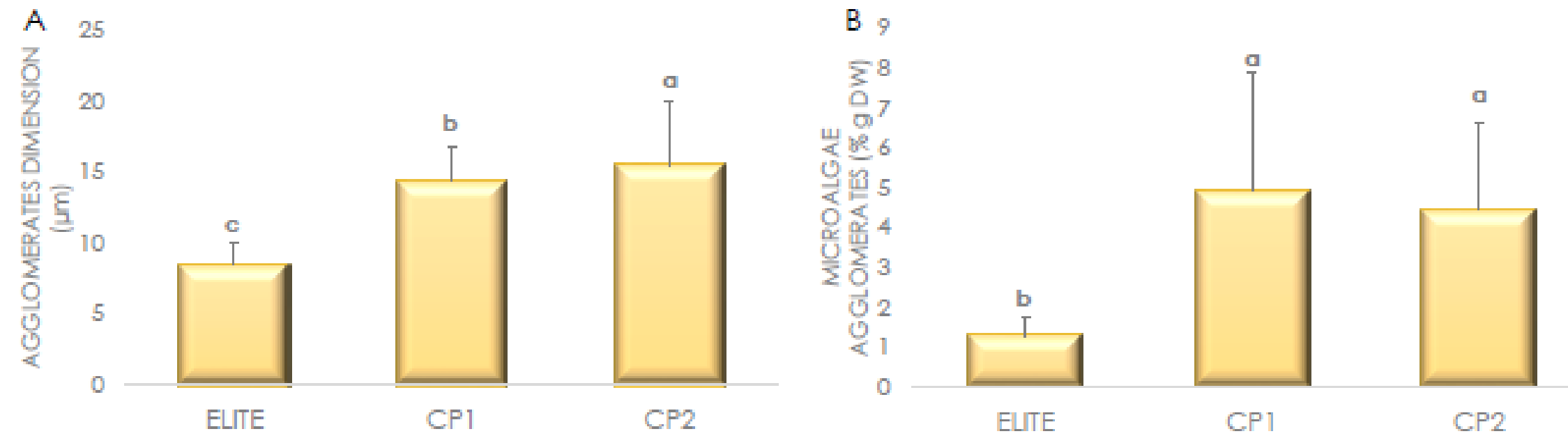


Figure 1- Characterization of microalgae agglomerates present in ELITE, commercial product 1 (CP1) and 2 (CP2): A) Microalgae agglomerates dimensions and B) percentage of microalgae agglomerates formed per dry weight. Data is expressed as means ± standard deviation. Significant differences between treatments are represented by different letters (One-way ANOVA, post hoc Tukey, p<0.05).

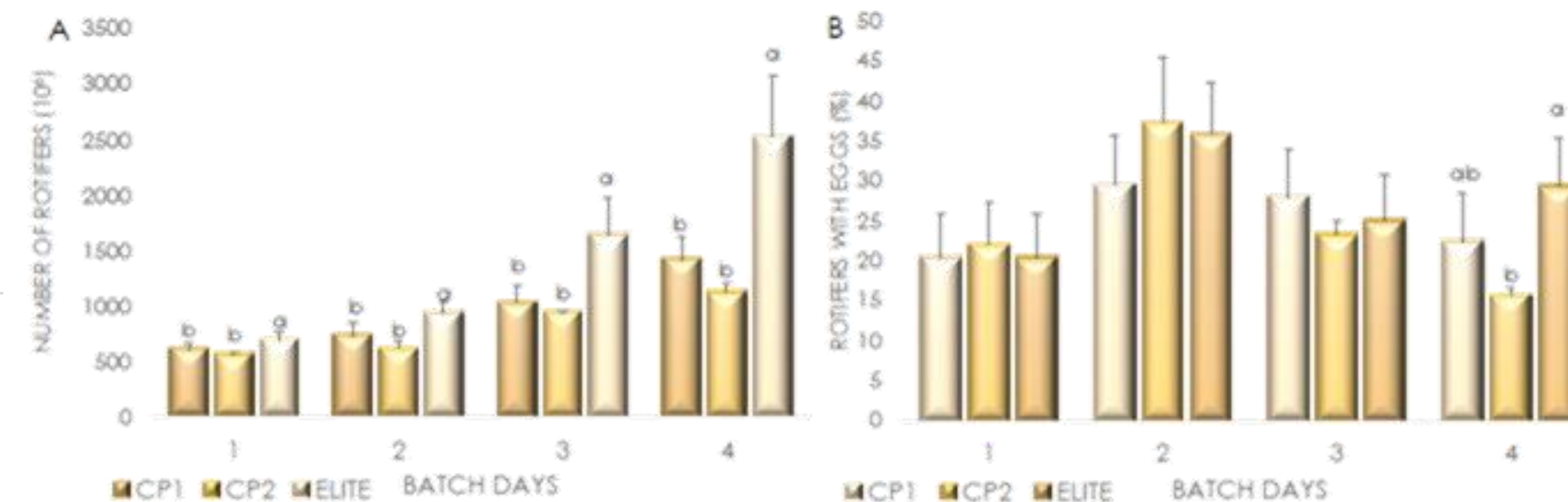
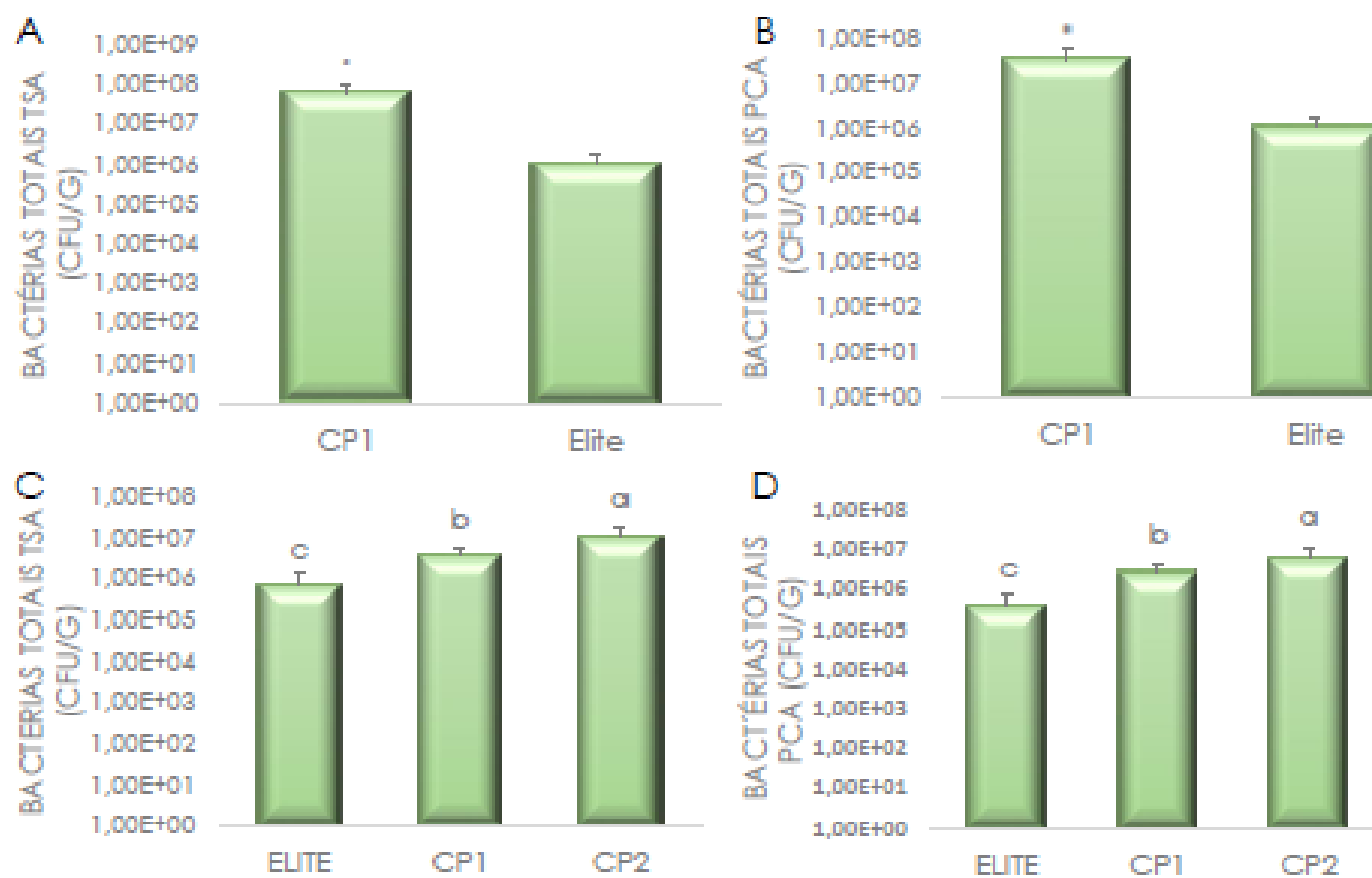
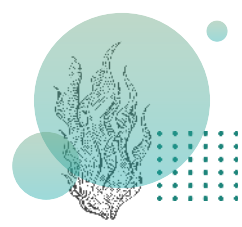


Figure 3 - Rotifers growth performance when fed with different diets: A) total number of rotifers produced per batch day, B) percentage of rotifers with eggs. Data is expressed as means ± standard deviation. Significant differences between treatments are represented by different letters (One-way ANOVA, post hoc Tukey, p<0.05).

O Phytobloom® ELITE Formula é uma dieta premium para cultivo de rotíferos com redução de carga microbiológica e redução de aglomerados de microalgas



20 jueves / octubre
2022

Phytobloom® RAS formula

aquaculture
europe
22

Rimini - Italy
27-30 september

eas
european
aquaculture
society

Desenvolvimento de novos produtos na Necton para rotíferos Em 2022

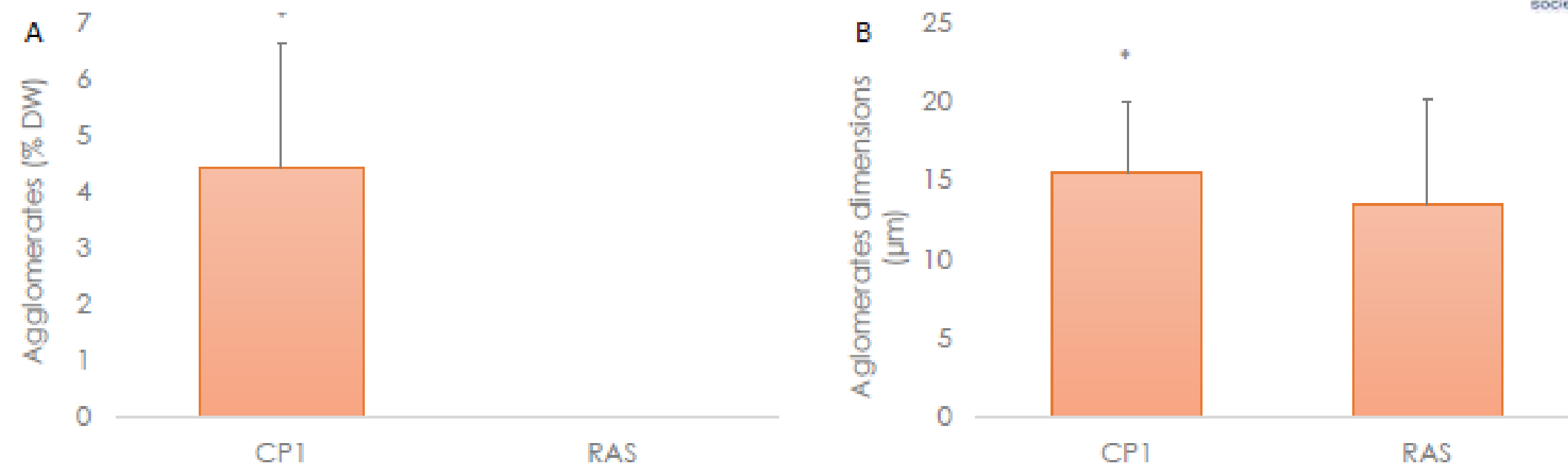


Figure 2- Comparison of microalgae agglomerates formed by RAS and CP1 product: A) Agglomerates produced per product dry weight (DW) (n=30) and B) microalgae agglomerates dimensions (n=257). Significant differences between treatments are represented with an asterisk (independent samples T-test, p<0,05).

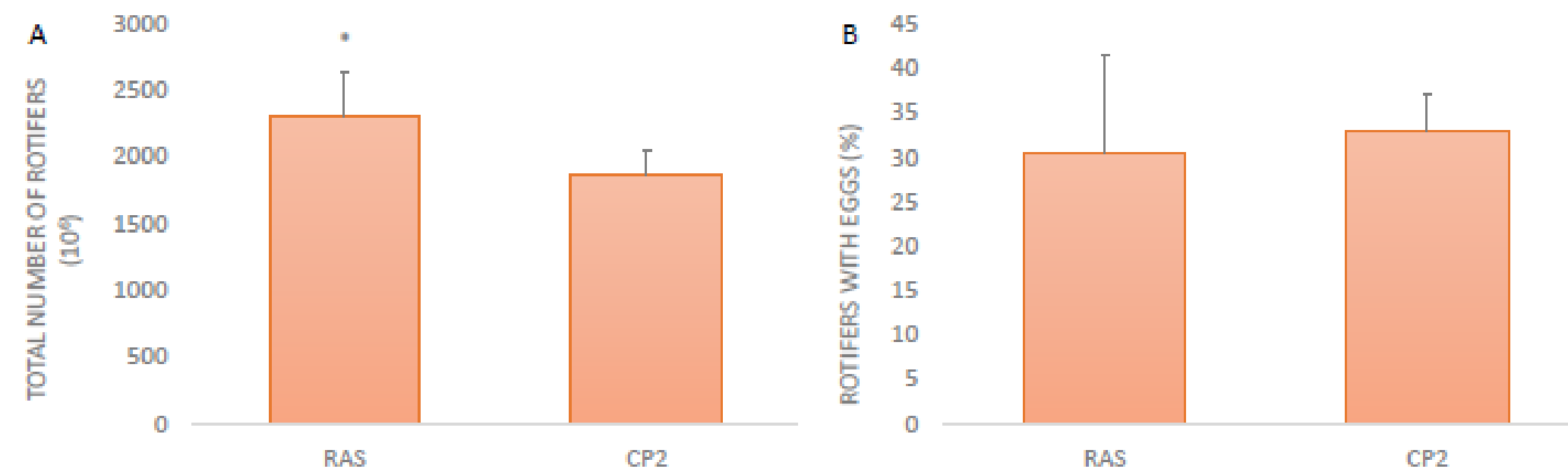
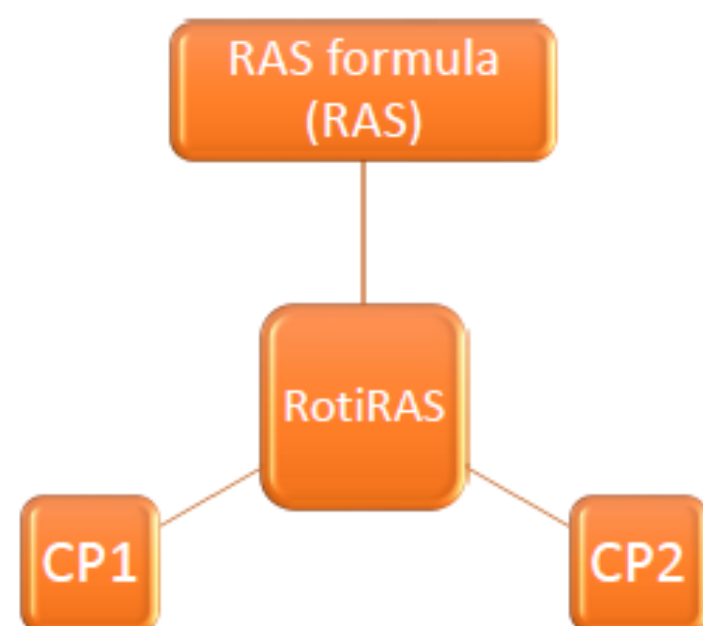
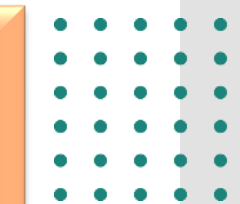
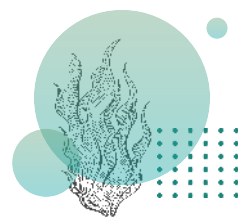


Figure 4- Rotifers production in RAS system when fed with RAS product and CP2: A) Average of total number of rotifers produced with each diet and B) average percentage of rotifers with eggs. Significant differences between treatments are represented with an asterisk (independent samples T-test, p<0,05).



O Phytobloom® RAS Formula foi aplicado com sucesso em sistemas RAS de rotíferos sem colmatação de filtros e atingir elevadas produções diárias de rotíferos





20 jueves / octubre
2022



Equipa de Inovação na Necton:

- Diretor
- 1 coordenador de inovação (PhD)
- 2 Gestores de inovação (PhD)
- 3 Técnicos de inovação (Msc)

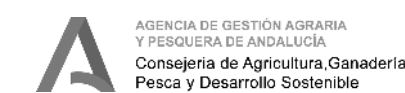
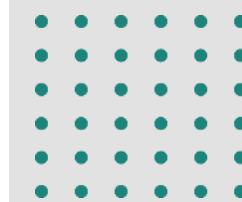
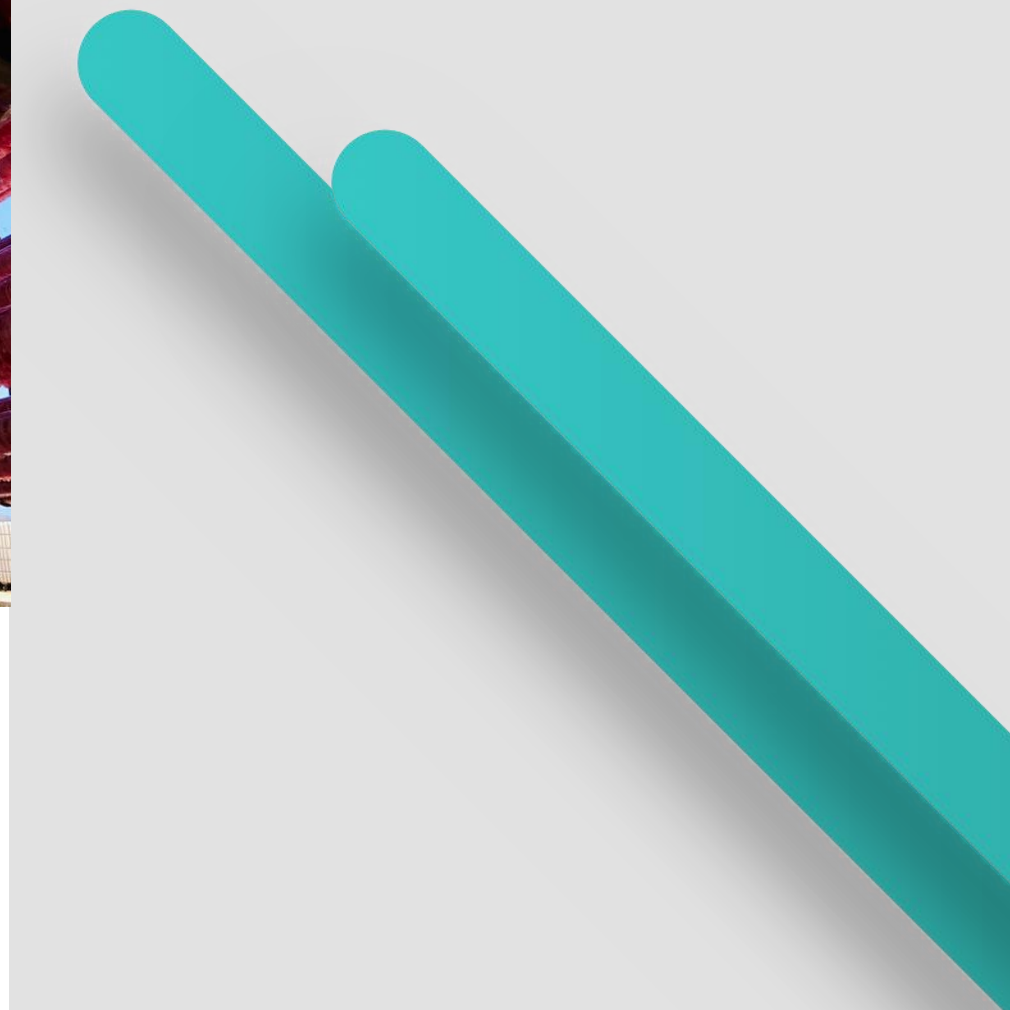
Estudantes:

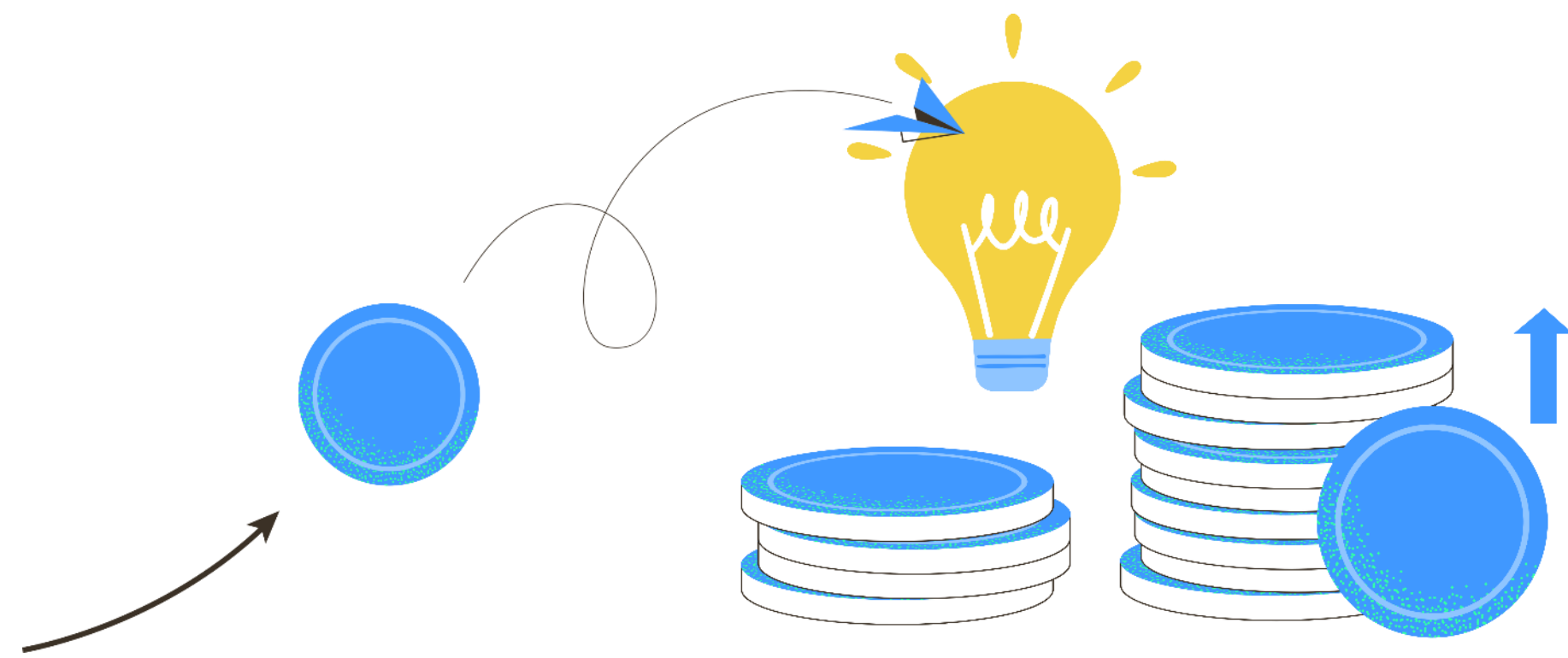
- 2 PhD students
- 4 MsC students

patricia.diogo@necton.pt

phyto
bloom

microalgae for dynamic people





A AGENCIA DE GESTIÓN AGRARIA
Y PESQUERA DE ANDALUCÍA
Consejería de Agricultura, Ganadería
Pesca y Desarrollo Sostenible

 **Interreg**
España - Portugal
Fondo Europeo de Desarrollo Regional




 **Atlazul**


 **CETMAR**
CENTRO TECNOLÓGICO DEL MAR

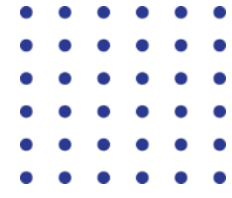
Gracias por su atención
obrigado pela sua atenção



 Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do
eiusmod tempor incididunt ut labore et dolore magna aliqua.

 +34 600 00 00

 loremipsum@miemail.com



A AGENCIA DE GESTIÓN AGRARIA
Y PESQUERA DE ANDALUCÍA
Consejería de Agricultura, Ganadería
Pesca y Desarrollo Sostenible

 **Interreg**
España - Portugal
Fondo Europeo de Desarrollo Regional



 **Atlazul**

 **CETMAR**
CENTRO TECNOLÓGICO DEL MAR