otational culture of the sea cucumber *Holothuria scabra* with the shrim *Litopenaeus stylirostris*: trade-off between growth performance and bioremediation, comparison with shrimp monoculture.

Hochard S.[1], Lemonnier H.[2], Letourneur Y.[3], Lorrain A.[4], Royer F.[2], Hubert M.[2]

1 ADECAL Technopôle, 1 bis rue berthelot, BP 2384, 98846 Nouméa cedex, NEW CALEDONIA

2 IFREMER, LEAD NC, Station de Saint Vincent – 98812 Boulouparis, NEW CALEDONIA

3 Université de la Nouvelle-Calédonie, Laboratoire LIVE, BP R4, 98851 Nouméa cedex, NEW CALEDONIA

4 IRD LEMAR, Centre IRD Nouméa, BP A5, 98848 Nouméa cedex, NEW CALEDONIA

ifremer

UNIVERSITÉ de la NOUVELLE-CALÉDONIE

ZONÉCO NOUVELLE-CALÉDONIE

ADECAL TECHNOPOLE NOUVELLE-CALÉDONIE

IRD Institut de recherche pour le développement

l context

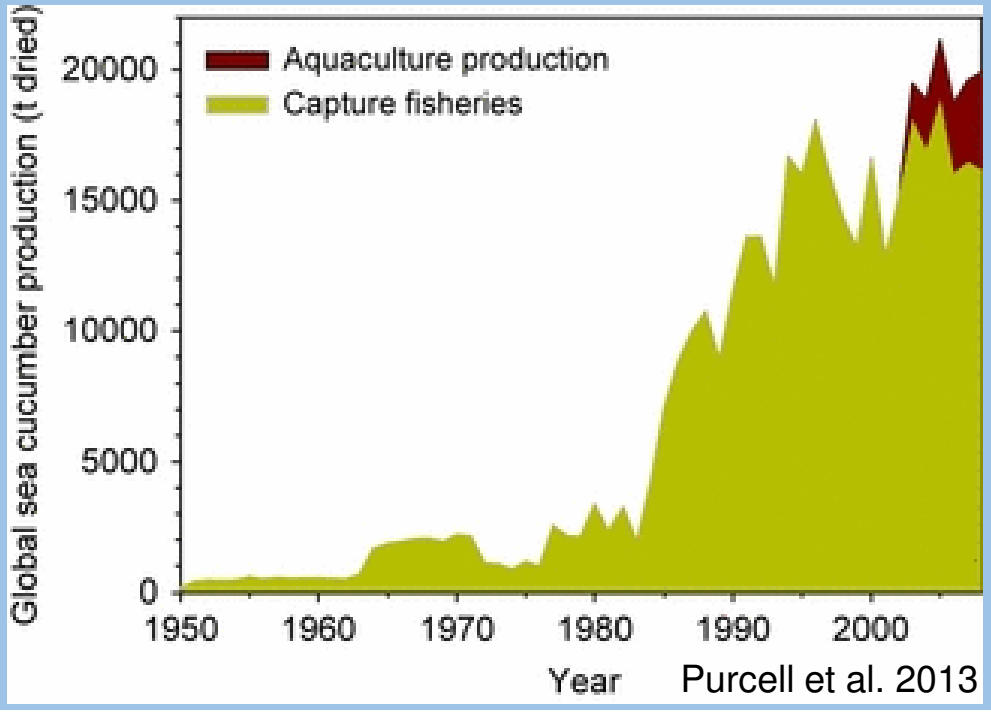
cumber fisheries represent 17 000 T.y^{-1} in dry weight (56 à 130 millions of US$.)

ve fishing=> massive reduction of naturals stocks.

ive aquaculture perspectives

ıa the sea cucumber aquaculture production reach 3 200 T.y^{-1} (dry weight)
ate species *Apostichopus japonicus.*

uaculture of the tropical species *Holothuria scabra* is still at its beginning.



Purcell et al. 2013

nt aquaculture methods

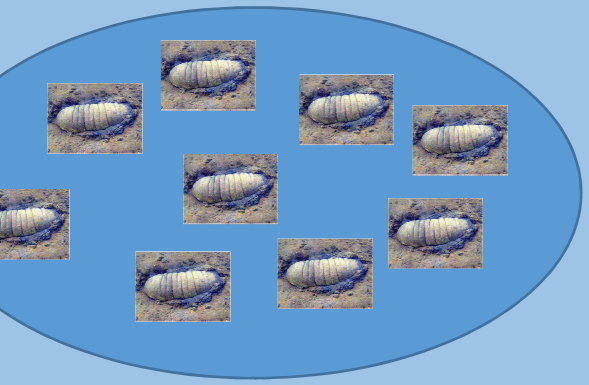
ching:

+ No cost for structures.

- Expose to natural alas.

-Necessity of an important maritime concession.

g in pens

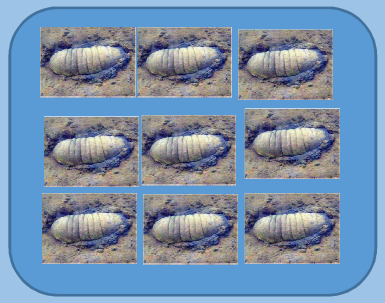


+ low cost of production, apart the pens.

- Expose to natural alas.

-Limited by the carrying capacity of the environment.

g in ponds



+ Semi-controlled system.

+ Higher productivity.

- Cost link to the structures, energy and the feed.

ediation

H. scabra = Benthic detrivorous species.

g could be articulate with a principal species, here shrimp, with a double benefit:

a farming could benefit from the organic matter produced/ accumulated by the culture of the pri
ustaining its growth.

assimilation by *H. scabra* could have a beneficial effect on the system quality and improvir
ental condition for the rearing of the principal species.

tudies showed that direct co culture may not be viable (Bell et al., 2007).

nal culture

BICAL program:

insert the farming of *H.scabra* in the New-Caledonian aquaculture based on ?

ade culture between the shrimp *L. stylirostris* and *H. scabra*.

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als :

Maximize the production performances of *H. scabra.*

ioremediate the pond in order to enhance the production performances of the *stylirostris.*

l and methods

rimental structures:

esocosms of 1,75 m^2 (1600L)

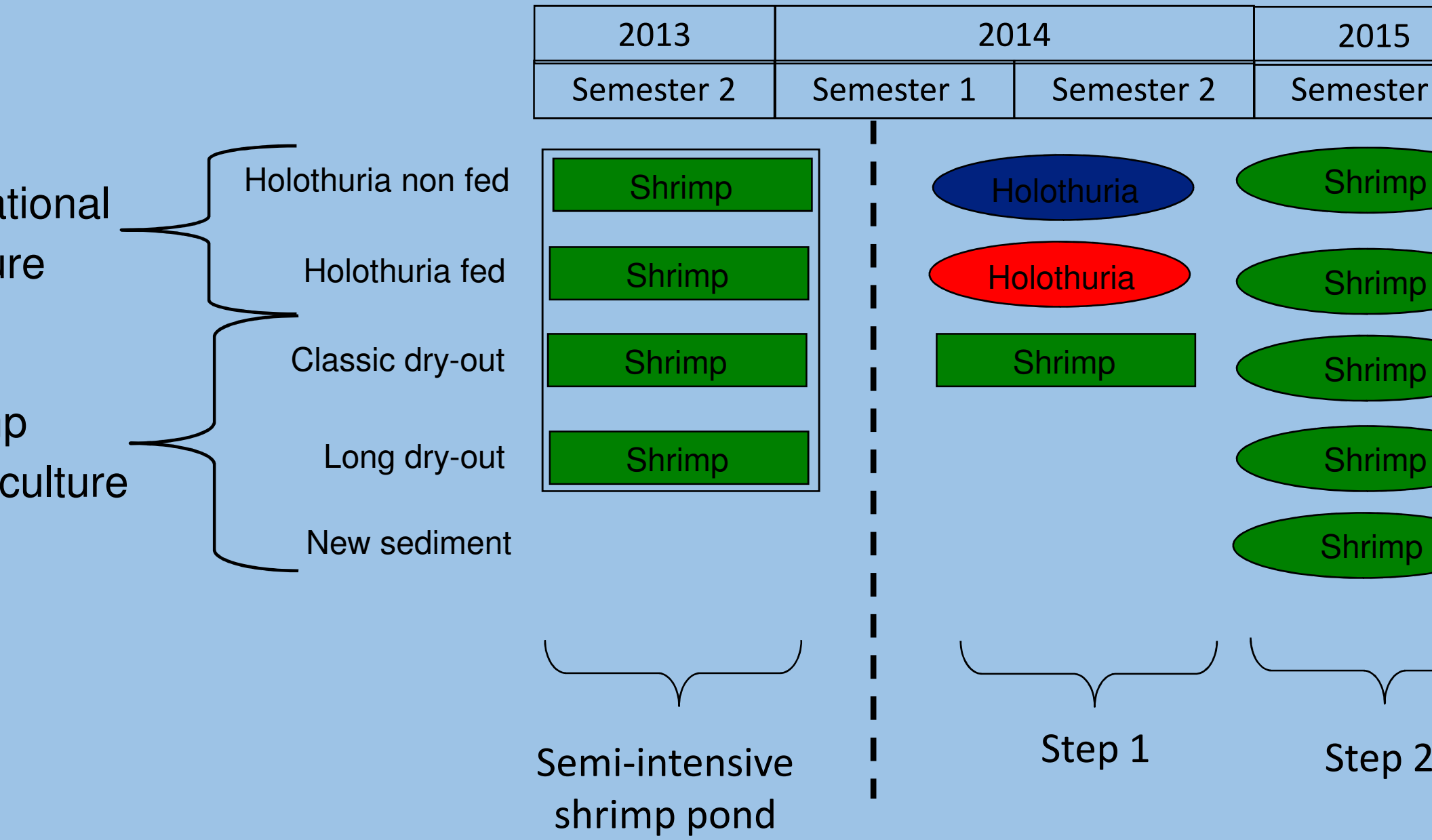
Two step experiment in mesocosms:

Step 1: H. Scabra farming

Study of different culture protocol on the growth performances and on the environment evolution.

Step 2: Shrimp farming

Comparison of the performances o rotational culture with shrimp monoculture


2013
2014
2015
Semester 2
Semester 1
Semester 2
Semester
ational
ure
p
culture
Holothuria non fed
Holothuria fed
Classic dry-out
Long dry-out
New sediment
Shrimp
Shrimp
Shrimp
Shrimp
Holothuria
Holothuria
Shrimp
Shrimp
Shrimp
Shrimp
Shrimp
Semi-intensive shrimp pond
Step 1
Step 2

Step 1:

Study of different culture protocol on the growth performances an on the environment evolution.

lutrition protocol

No food supply

Food supply (corn waste)

igh density (6 ind.m^{-2})

Non fed

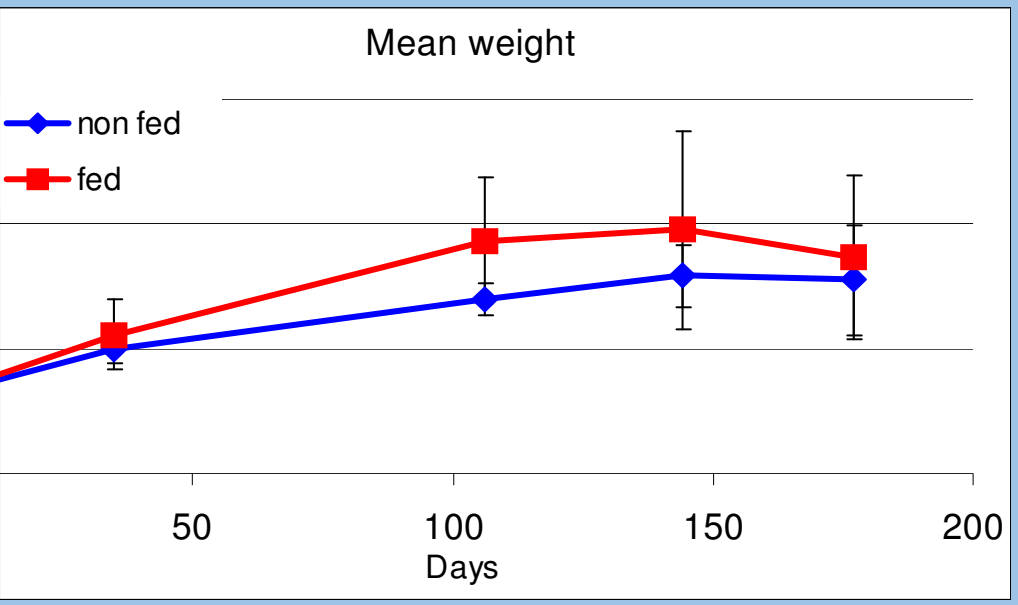
fed

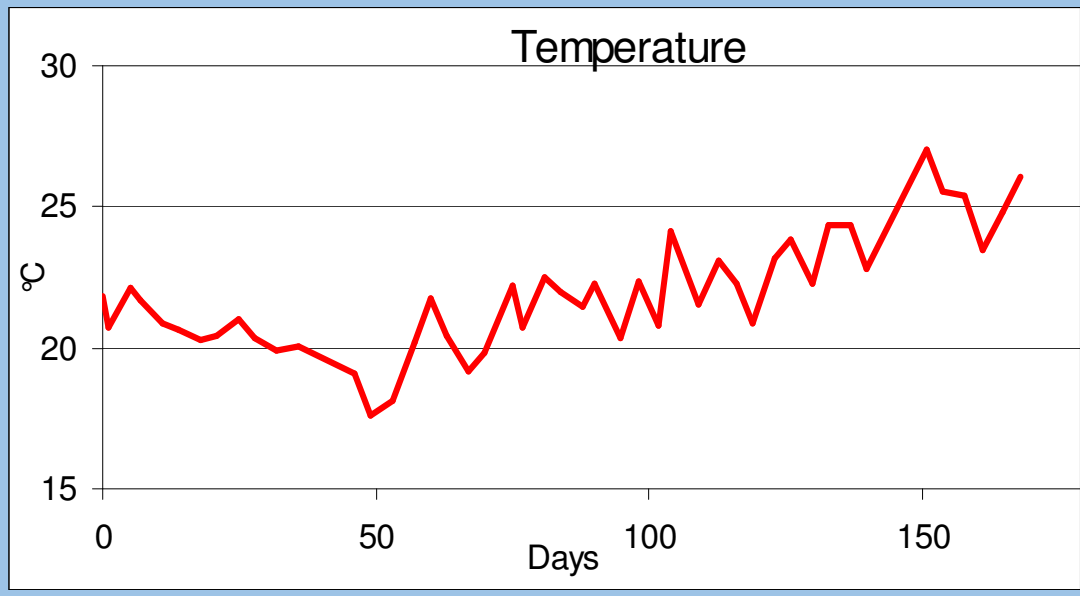
ow density (3 ind.m^{-2})

Low density

Control (no animals)

ction performances

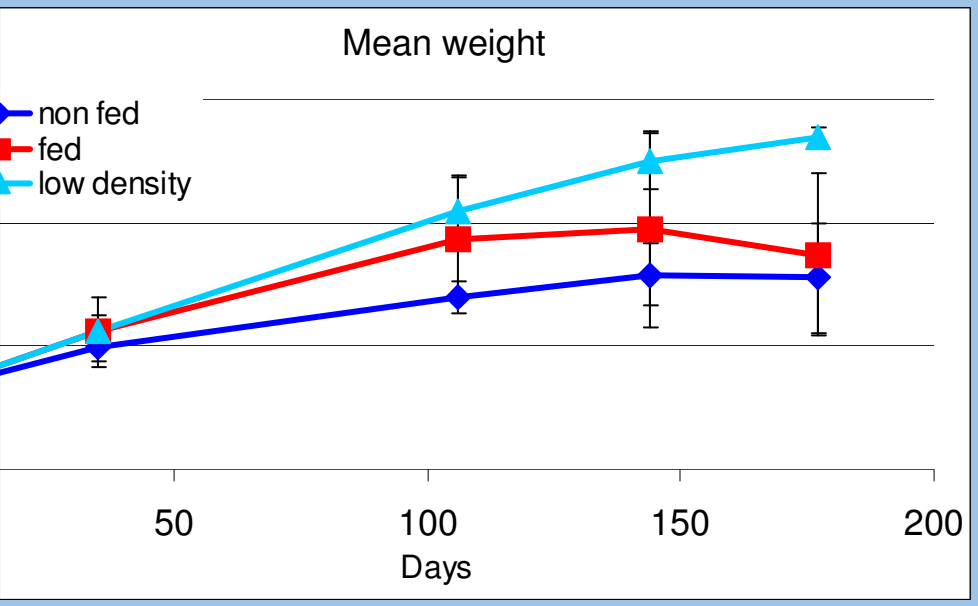




eding led to a better growth at the beginning of the experiment.

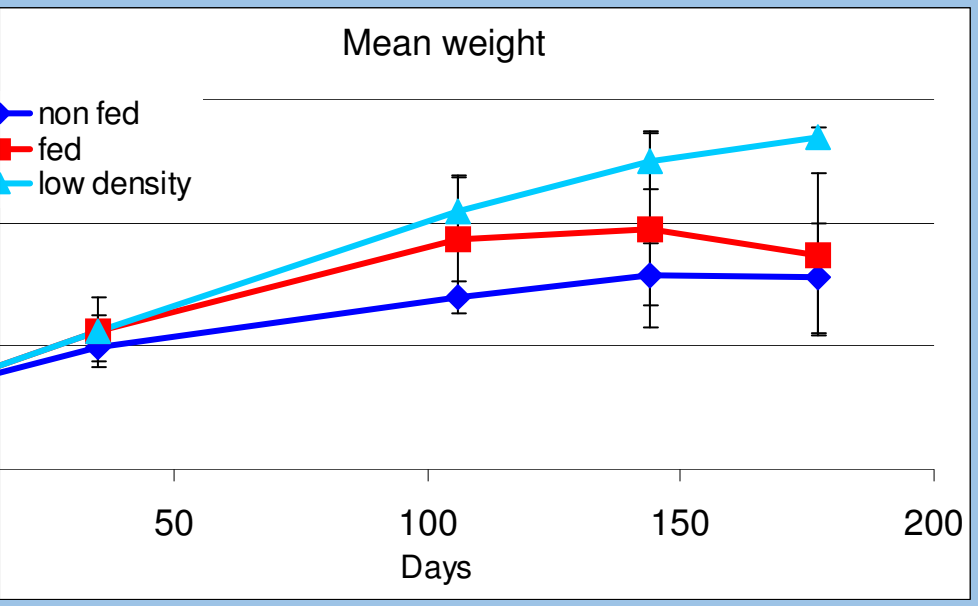
ter 100 days, lower growth in spite of more favorable temperatures.

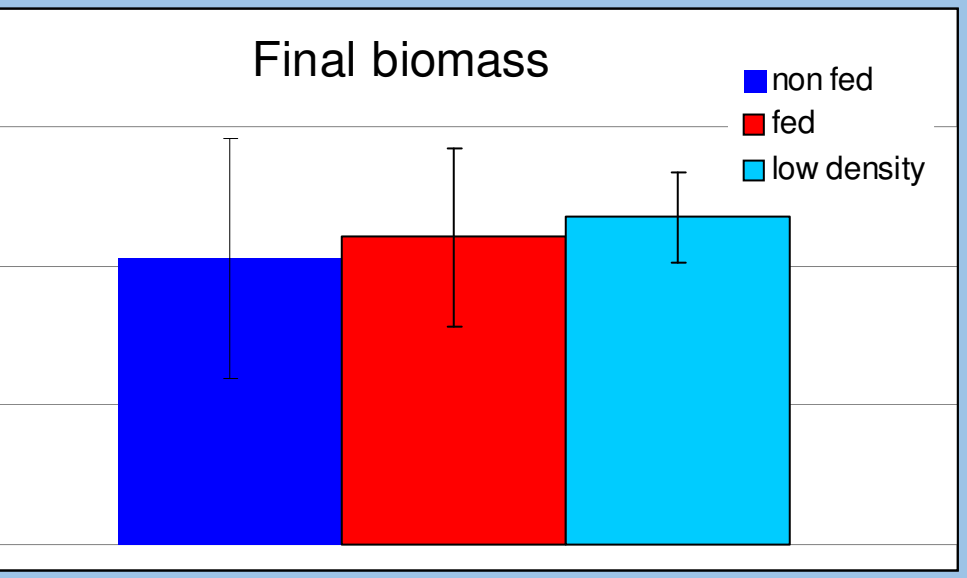
ction performances



Lower density led to constant growth, w
higher mean weight.

ction performances





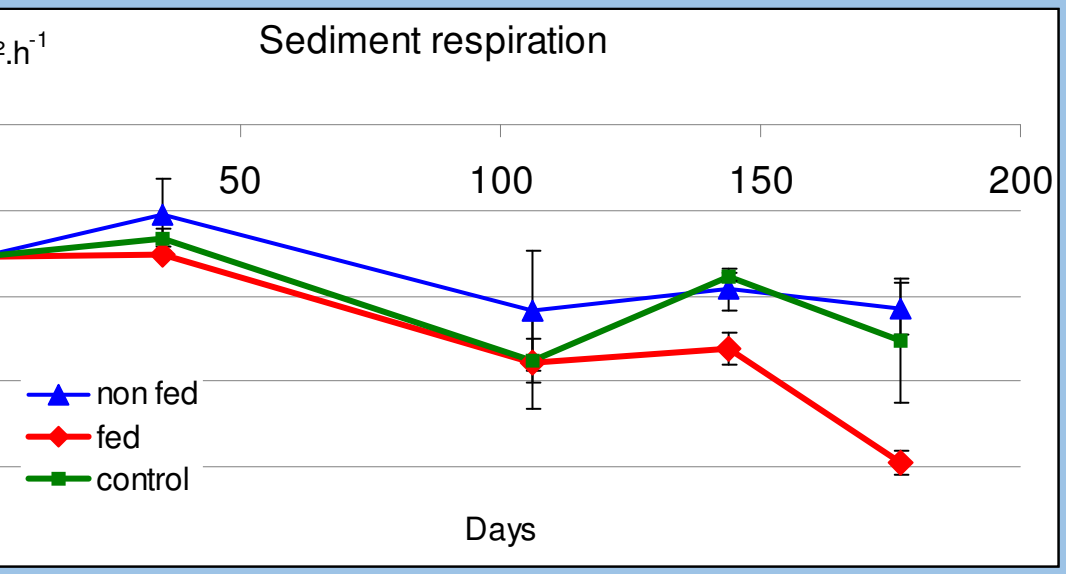
Lower density led to constant growth, w
higher mean weight.

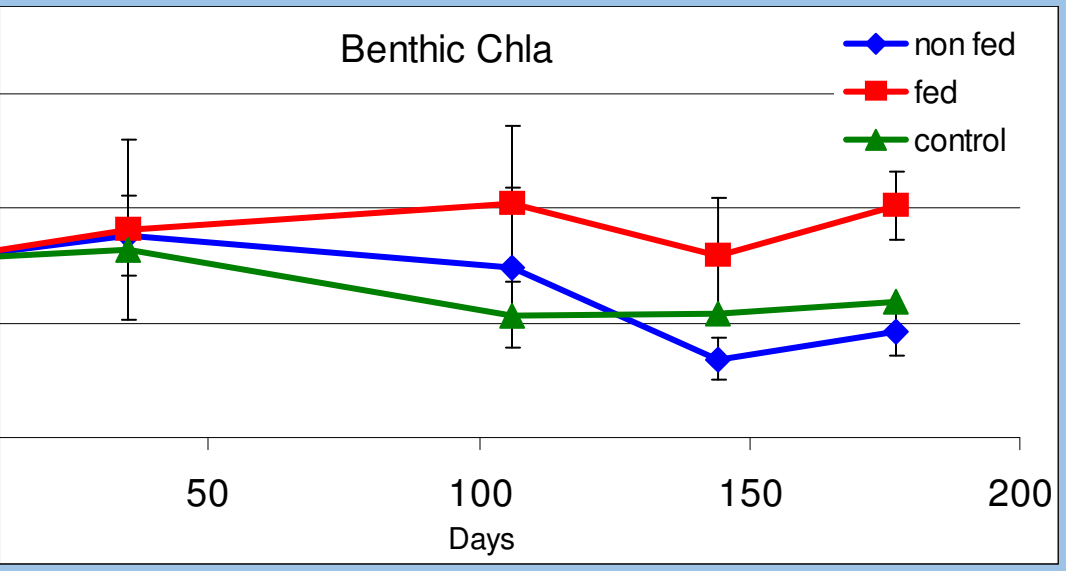
Survivals were above 80% for all
treatments.

The carrying capacity of the system
equivalent for all the treatments at the
of the experiment.

=>Feeding might allow faster growth
cannot outcome the carrying capacity of
system.

mediation performances



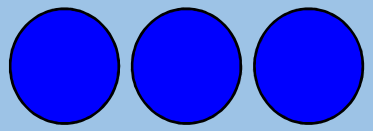


⇒The non feed treatment is equivalen the control.

⇒Feeding led to an enrichement of sediment.

⇒Bioremediation appeared to depen the rearing strategy.

usions of step 1

olothuria non fed 

Lowest production performances

Best “bioremediation”

Holothuria fed 

Best production performances

Lowest “bioremediation”

Step 2:

Comparison of the performances of rotational culture with shrimp monoculture.

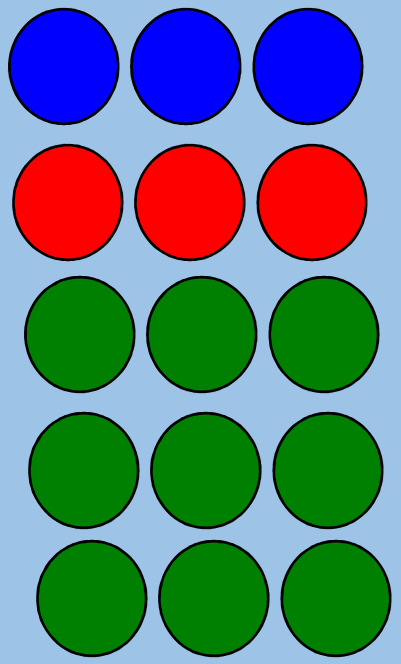
othuria non fed

Holothuria fed

Classic dry-out

Long dry-out

New sediment



All the mesocosmes received post larvae with a density of 20 shrimp $.m^{-2}$.

The experiment last for 120 days, from March to June

mental characteristics of the sediment at the beginning of the experiment

	New sediment	*Long dry-out*	*Holothuria non fed*	*Holothuria fed*	*Classic dry*
pH	6,87	7,15	7,33	7,21	6,84
(mV)	68,1	18,3	19,0	24,1	41,9
g/m²)	16,6	66,8	119,7	120,5	147,2
M (%)	1,7	1,6	2,0	2,2	2,3
(µM)	125	283	65	144	1437
M/h)	6999	11943	5577	7264	8268
M/h)	-2639	-3594	-4550	-4764	-4513

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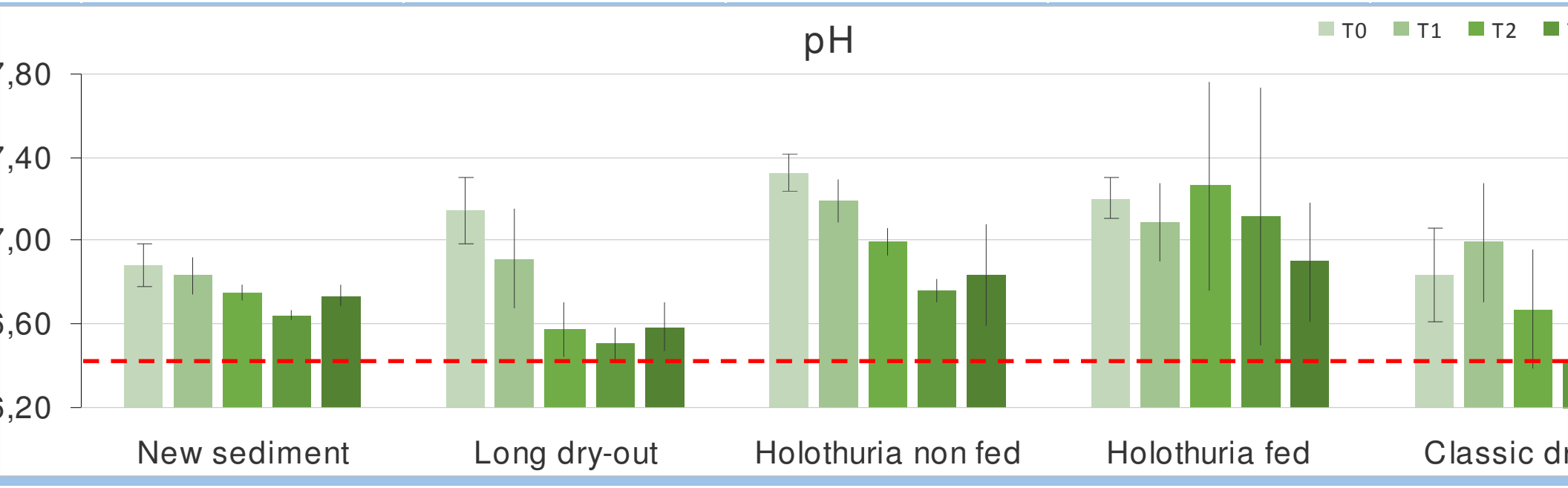

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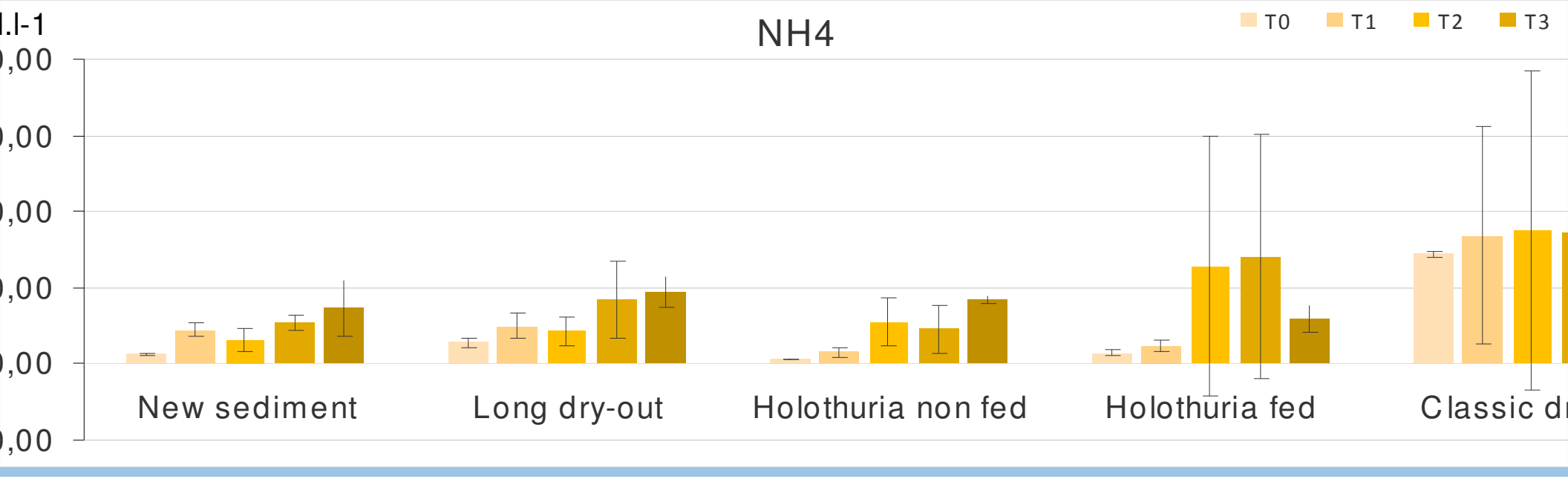

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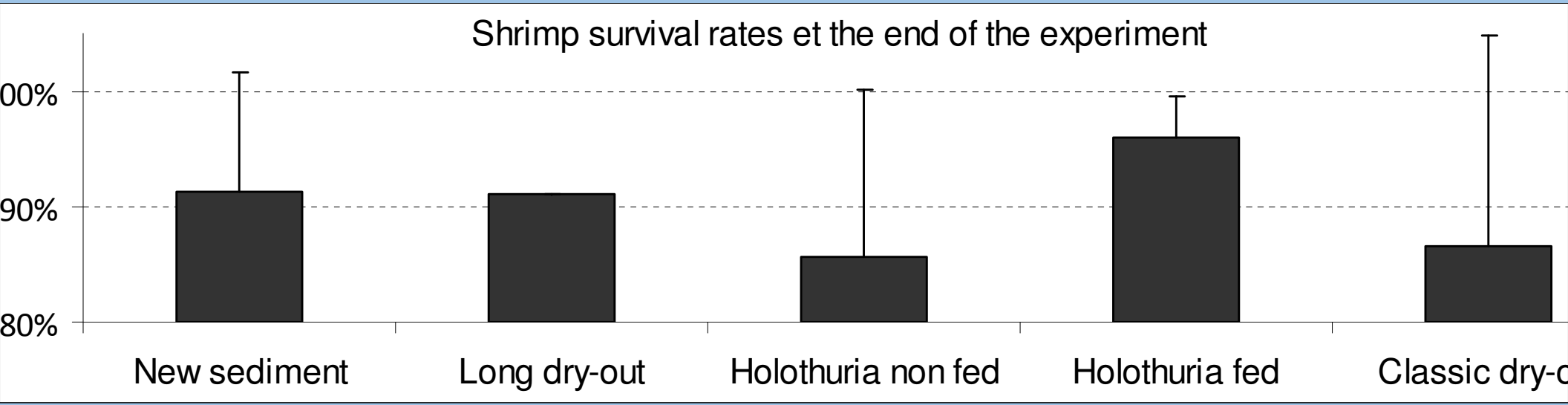
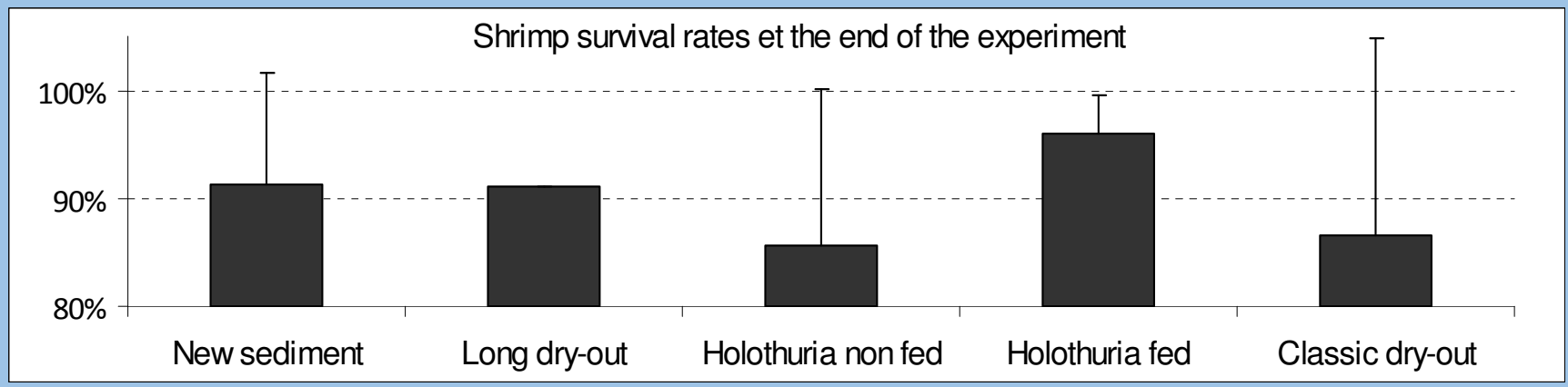
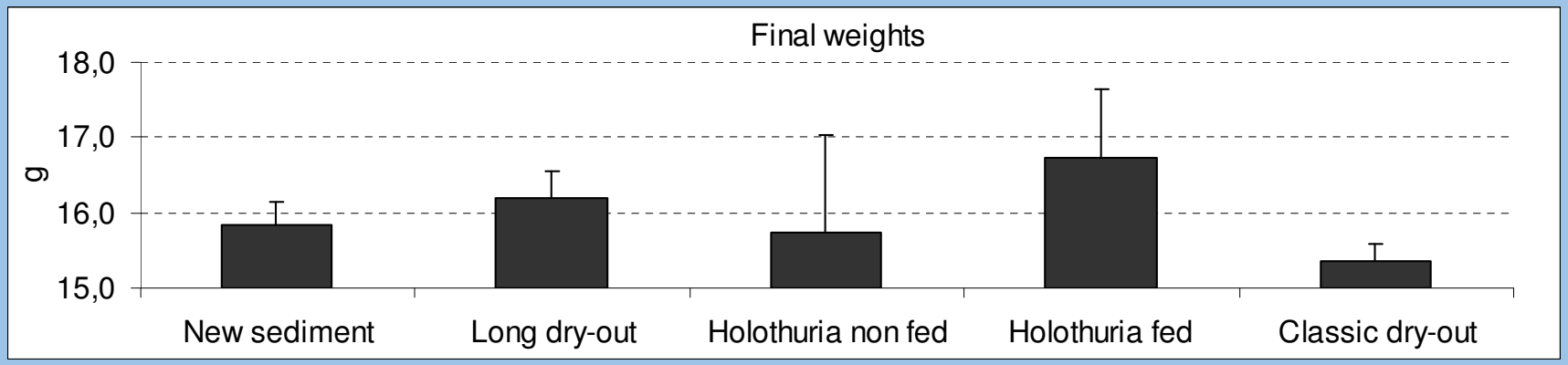
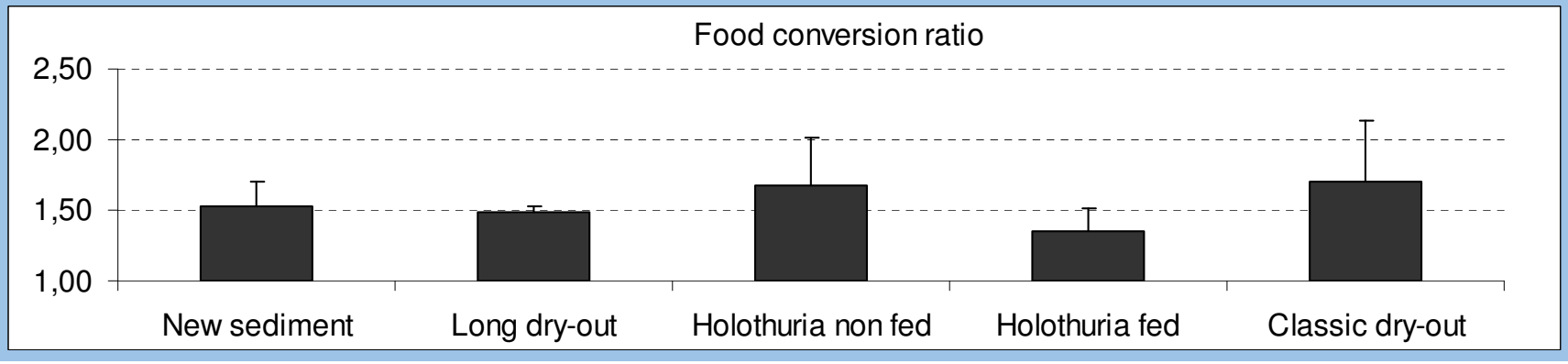


Very similar zootechnical performances between the treatments







clusion:

huria farming:

tion performances:

might ameliorate growth rate but did not allow to outcome the system carrying capacity.

ensity permitted much better zootechnical performances.

ediation:

led to an enrichment of the system.

differences between the control and the non fed treatment.

np farming:

ediation:

iment characteristics were mainly influence by the dry out time.

lar dry out time, rotational culture presented cleaner sediments.

tion performances:

nical performances were comparable between the treatments.

spectives:

are analyzing Isotopes and fatty acid data

ntify the food sources of *H. scabra* during the experiment.

d a more adapted aliment.

oremediation?”

e medium scale zootechnical experiment of *H.scabra* farming.

culture with other species (fish…) appear as the most attractive
ario.

Thank you.

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