UNIVERSITY OF PADOVA

Growth and mortality of oysters (*Crassostrea gigas*) in Sacca degli Scardovari (Italy)

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OYSTER PRODUCTION

- Globally, an important sector within molluscan aquaculture (32%)
- **Pacific cupped oyster (*Crassostrea gigas*)**

  The most cultivated species worldwide: rapid growth and great adaptation

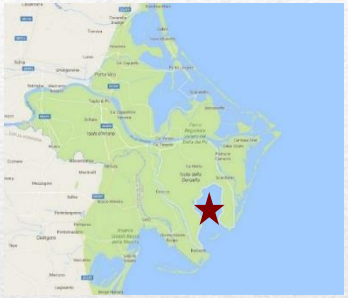
  573.617 tonnes in 2016 (FAO, 2018) (China, main producer)

ITALY (53 tonnes)

Good diversification opportunity!!

WORK JUSTIFICATION

- A farming system developed in **France** (Thau, Mediterranean) imported into **Italy** (Sacca degli Scardovari, Adriatic)



Veneto Regional Park
"Delta del Po"

- The lagoons present different climate conditions and water characteristics
- The farming system needs to be adequately fine-tuned under the conditions of Sacca degli Scardovari

AIM

To assess growth, mortality and quality of *Crassostrea gigas* reared in suspended ropes in the lagoon of Sacca degli Scardovari

Comparing **three different rope emersion-immersion times** (farm standard vs. long vs. short) throughout the growing period (8 months: October 2016 - June 2017)

MATERIAL AND METHODS

OYSTER PLANT

- Centre of the lagoon and 500 m from the coast
- Mean depth: 2.50 m
- 12 perches with 12 suspended ropes
- Rope length: 2.0 m
- Perch movement by remote control using photovoltaic and wind-powered energy

MATERIAL AND METHODS

- 4320 triploid oysters
- Cemented onto 36 ropes (120 oysters/rope) in drops of 4 oysters

First two months: continuous immersion
Then, **three emersion-immersion times**

FARM STANDARD
variable duration
atmospheric conditions
(1 perch, 12 ropes)

LONG
14 emersion hours/day
10 immersion hours/day
(1 perch, 12 ropes)

SHORT
7 emersion hours/day
17 immersion hours/day
(1 perch, 12 ropes)

MATERIAL AND METHODS

❖ Morphological characteristics and Mortality

1) At sticking (October 2016):

Oyster weight and shell length, width and depth in 432 oysters (10%)

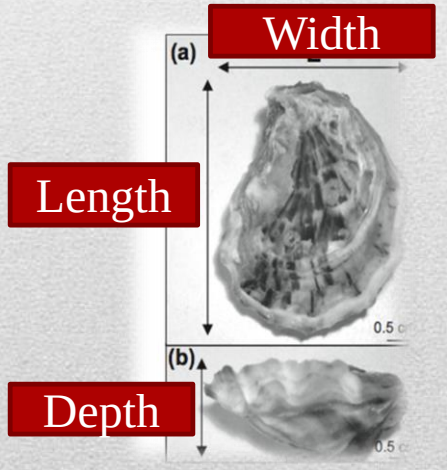
2) At 2, 4, 7 and 8 months from sticking

- Shell length and width in 10 ropes/emersion system at 3 depth levels (30 ropes: 360 oysters)
- Mortality (all oysters)

3) At harvest (June 2017):

- Oyster weight and shell length, width and depth
- Muscle quality characteristics

90 oysters (30 samples/emersion system)



(Adapted from Batista et al., 2008)

MATERIAL AND METHODS

❖ Statistical analysis (SAS Software):

Morphological data during the growing period

PROC GLM

Main effects: emersion system, sampling time, rope, depth level and emersion system x sampling time

Morphological data at harvest

PROC GLM

Main effects: emersion system, rope and their interaction

Mortality data

PROC CATMOD

Main effects: emersion system, rope, depth level and their interactions

RESULTS

Morphological characteristics during the growing period

	Sampling time (months)				P-value
	2 (December)	4 (February)	7 (May)	8 (June)	
Shell length (mm)	45.4[a]	47.0[a]	77.6[b]	76.0[b]	<0.001
Shell width (mm)	33.5[a]	33.0[a]	64.9[c]	59.6[b]	<0.001
Shell width/length	0.74[a]	0.71[a]	0.84[b]	0.80[b]	<0.001

RESULTS

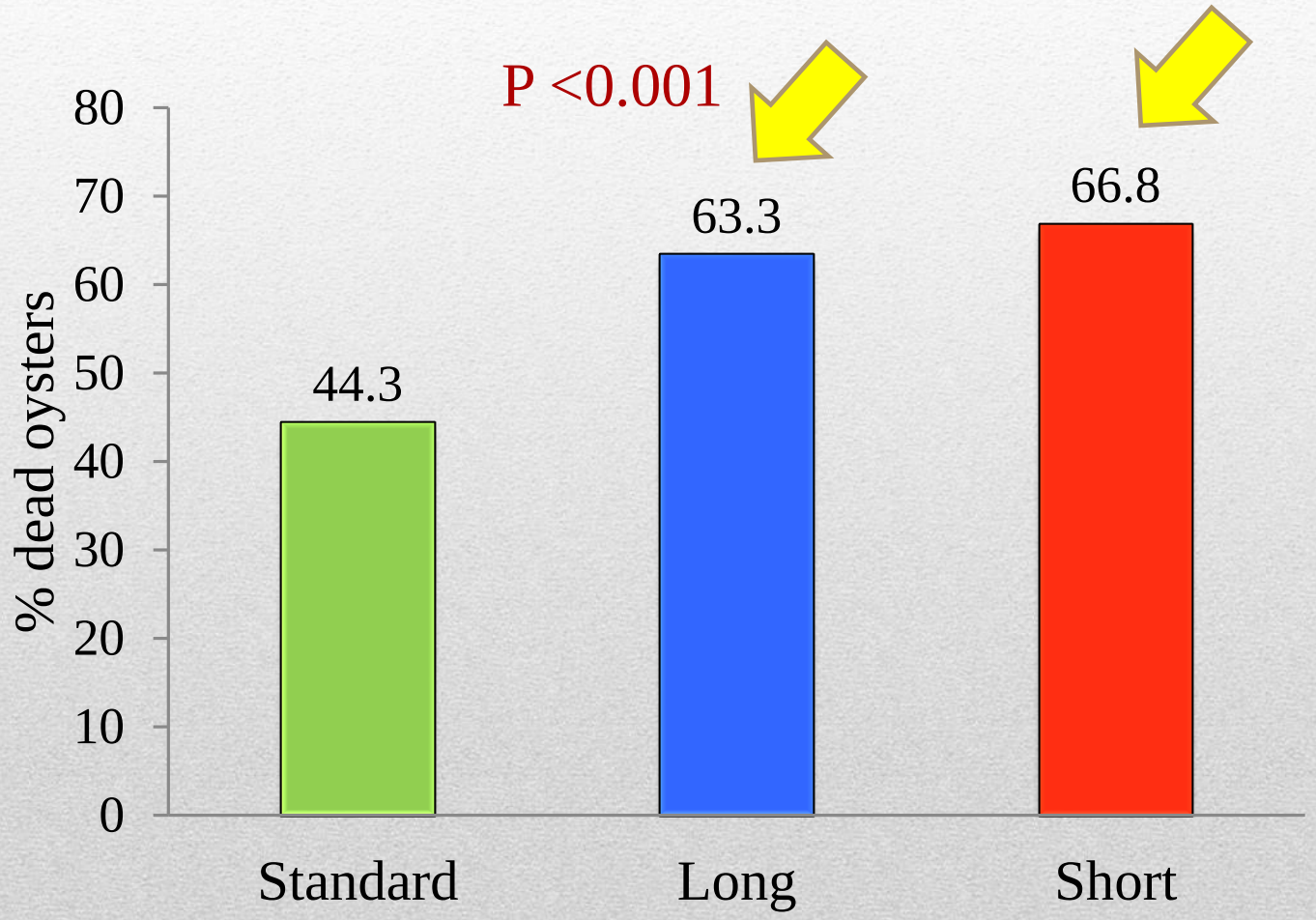
Morphological characteristics during the growing period

	Emersion system			P-value
	Standard	Long	Short	
Shell length (mm)	63.0[b]	60.4[a]	61.1[a]	<0.01
Shell width (mm)	48.9[b]	46.8[a]	47.4[a]	<0.01
Shell width/length	0.78	0.77	0.78	n.s.

RESULTS

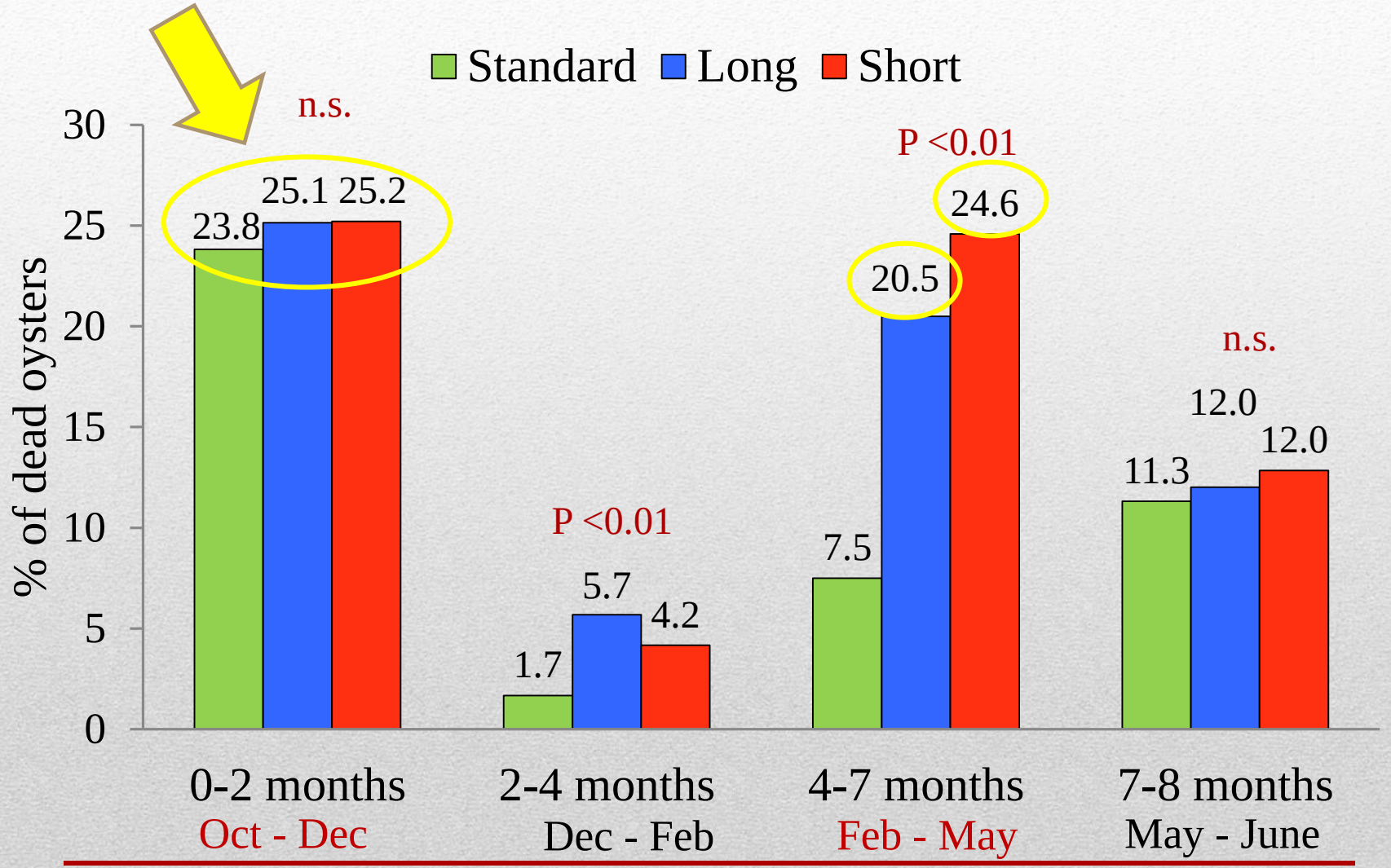
Mortality at the end of the growing period

(% with respect to the initial number)



RESULTS

Partial mortality during the growing period



RESULTS

Morphological characteristics at harvest (8 months from sticking)

	Emersion system			P-value
	Standard	Long	Short	
Oyster weight (g)	68.3^{b}	66.3^{b}	56.7^{a}	<0.01
Shell length (mm)	78.1^{b}	77.2^{b}	71.2^{a}	<0.01
Shell width (mm)	55.6	55.0	50.8	0.09
Shell depth (mm)	29.2^{b}	29.7^{b}	27.0^{a}	<0.05
Shell depth/length	0.38	0.39	0.38	n.s.
Muscle length (mm)	17.9^{ab}	18.4^{b}	17.1^{a}	<0.05

RESULTS

Muscle rheological traits at harvest (8 months from sticking)

	Emersion system			P-value
	Standard	Long	Short	
Hardness (g)	1430^{b}	1422^{b}	1027^{a}	<0.05
Cohesiveness	0.49^{a}	0.53^{b}	0.51^{ab}	0.06
Elasticity (mm)	1.63	1.44	1.59	n.s.
Chewiness (g/mm)	1160^{b}	1087^{b}	790^{a}	0.06

Texture profile

- No emersion system effect on other muscle quality traits:

  pH, L*a*b*, proximal composition, fatty acid profile or total volatile basic nitrogen

CONCLUSIONS

Under the conditions tested in Sacca degli Scardovari

- Oysters achieved the commercial size after 8 months
- Average mortality during growth was 58%

The farming system based on suspended ropes submitted to emersion and immersion periods appeared feasible and promising

Short fixed emersion time (7 hours) was the least favourable with lower growth and muscle development and higher mortality

THANKS FOR YOUR ATTENTION!

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