

Comparative growth of the Mediterranean mussel (*Mytilus galloprovincialis* Lamarck, 1819) reared in three coastal areas of Sardinia

S. Serra¹, G. Chessa¹, S. Saba², M. Trentadue¹, S. Manca¹,
F. Chessa¹, N. Fois¹, A. Pais²

¹ AGRIS Sardegna – Servizio Risorse Ittiche - Dipartimento di Ricerca delle Produzioni Animali

² Sezione di Acquacoltura e Gestione delle Risorse Acquatiche - Dipartimento di Scienze Zootecniche - Università degli Studi di Sassari

Mussel culture in Sardinia

- Mussel culture is the most important aquacultural activity in Sardinia.

	1992	2008	
Mytilus	4000	10662	+ 6662
Oyster	3	6	+ 3
Sea bass	50	646	+ 596
Gilthead Sea bream	50	1385	+ 1335
Eel	90	104	+ 14

(Viale, 2009 mod.)

- In 2008 mussel culture represented 83% of the species grown in aquaculture. In the same year the production of *Mytilus* (11,000 tons) increased by 60% compared to the 1992 production.

Objectives

- Evaluate the influence of different environmental conditions on the growth of mussels
- **Identify (Discover)** a new areas for mussel cultures



Material and methods

Mytilus galloprovincialis (42.5 ± 3.1 mm shell length, 2.3 ± 0.6 g wet meat weight) were grown in suspended culture in three different Sardinian coastal lagoons:

- Calich
- Porto Pozzo
- Tortoli

Mussels were placed in 80 cm long meshes hanging on longline systems from April to October 2010.



Calich

Eutrophic lagoon located in north-western Sardinia



Surface area: 92 ha
Maximum depth: 2 m

SITR-IDT

Terraitaly - © Compagnia Generale Ripresaere

Agris

Agenzia regionale per la ricerca in agricoltura



REGIONE
AUTONOMA
DELLA SARDEGNA

Porto Pozzo

Oligotrophic lagoon located in northern Sardinia



Tortoli

Mesotrophic lagoon located in eastern Sardinia



Material and methods

Hydrological variables

- Fortnightly monitoring of hydrological variables (temperature, salinity, pH, and dissolved oxygen) by OCEAN SEVEN 316Plus CTD multiparameter probe.
- Calich 24 stations
- Porto Pozzo 13 stations
- Tortolì 14 stations



Material and methods

Laboratory analysis

- Monthly water analysis (chlorophyll a and seston).
- Chlorophyll a content in the water column was determined by spectrophotometric method (wavelength 664 and 750 nm).
- Seston content (plankton and tripton) in the water column was determined by gravimetric method.

Material and methods

Morphometric measurement

Monthly measurement of morphometric variables (60 mussels from each of the experimental groups)

- shell length
- wet shell weight
- wet meat weight
- wet total weight
- Condition Index



Statistical analysis

Two-way analysis of variance between 'sites' and 'sampling periods' (*Post-hoc* multiple comparisons were performed using the Student-Newman-Keuls test)

Results

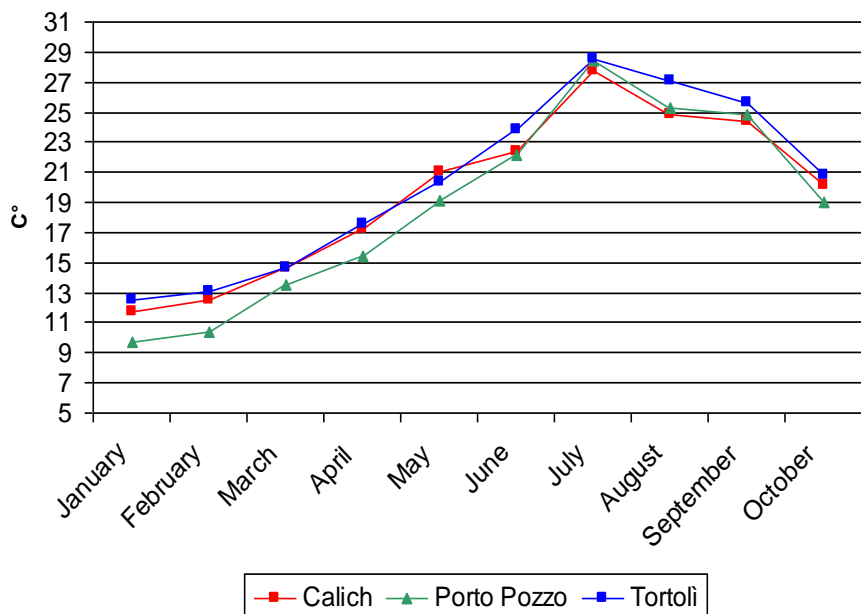
Hydrological variables

In July all the lagoons reached high temperatures.

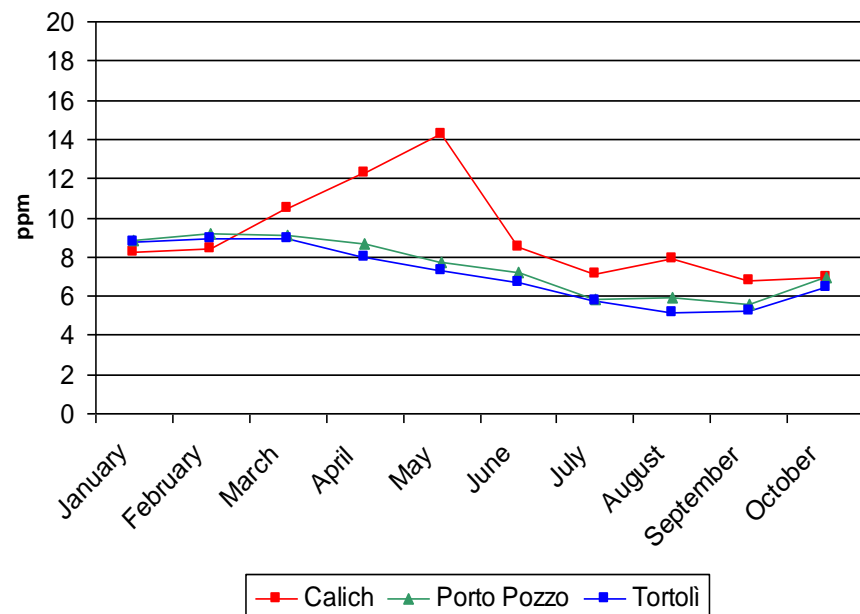
The lowest temperatures were registered in Porto Pozzo lagoon.

In May high oxygen levels were detected in Calich lagoon.

Temperature



Oxygen



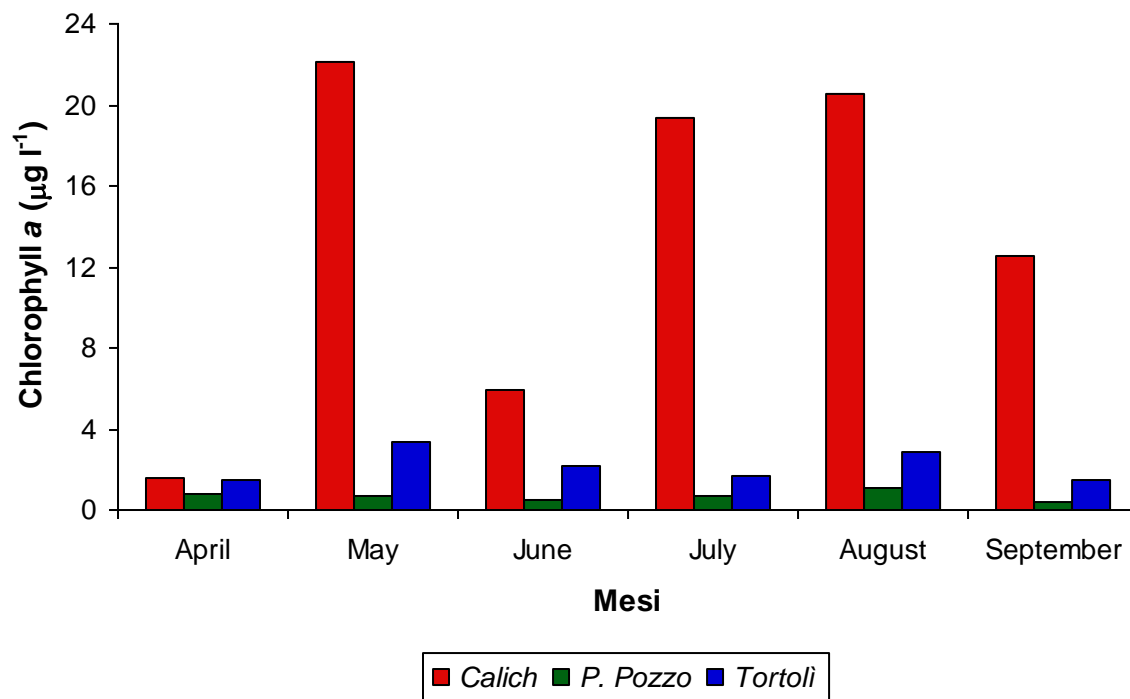
Results

Laboratory analysis

- *Chlorophyll a*

Chlorophyll a

		<i>Calich</i>	<i>P.Pozzo</i>	<i>Tortoli</i>
April	µg/l	1.61	0.83	1.51
May	µg/l	22.13	0.65	3.39
June	µg/l	5.89	0.54	2.17
July	µg/l	19.39	0.65	1.72
August	µg/l	20.55	1.04	2.87
September	µg/l	12.50	0.42	1.50



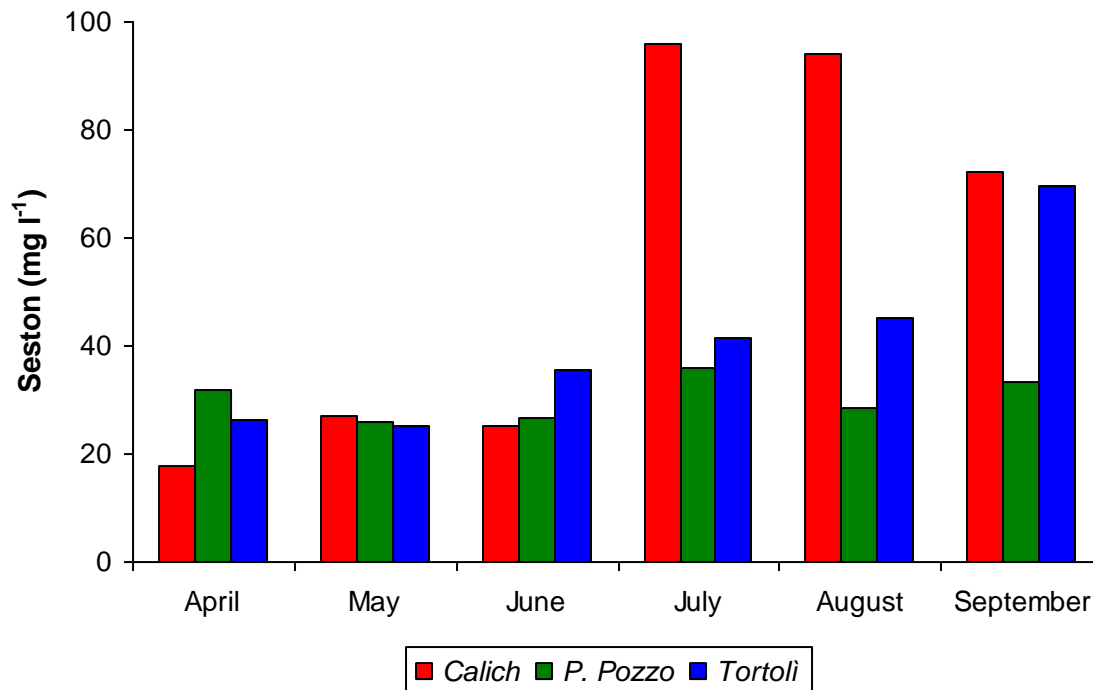
Porto Pozzo lagoon showed the lowest levels of *Chlorophyll a* and Calich lagoon the higher ones.

Results

Laboratory analysis

- Seston

		Seston		
		<i>Calich</i>	<i>P.Pozzo</i>	<i>Tortoli</i>
April	mg/l	17.68	31.80	26.40
May	mg/l	27.00	25.80	25.10
June	mg/l	25.17	26.70	35.43
July	mg/l	96.00	36.00	41.33
August	mg/l	94.00	28.40	45.29
September	mg/l	72.33	33.50	69.75

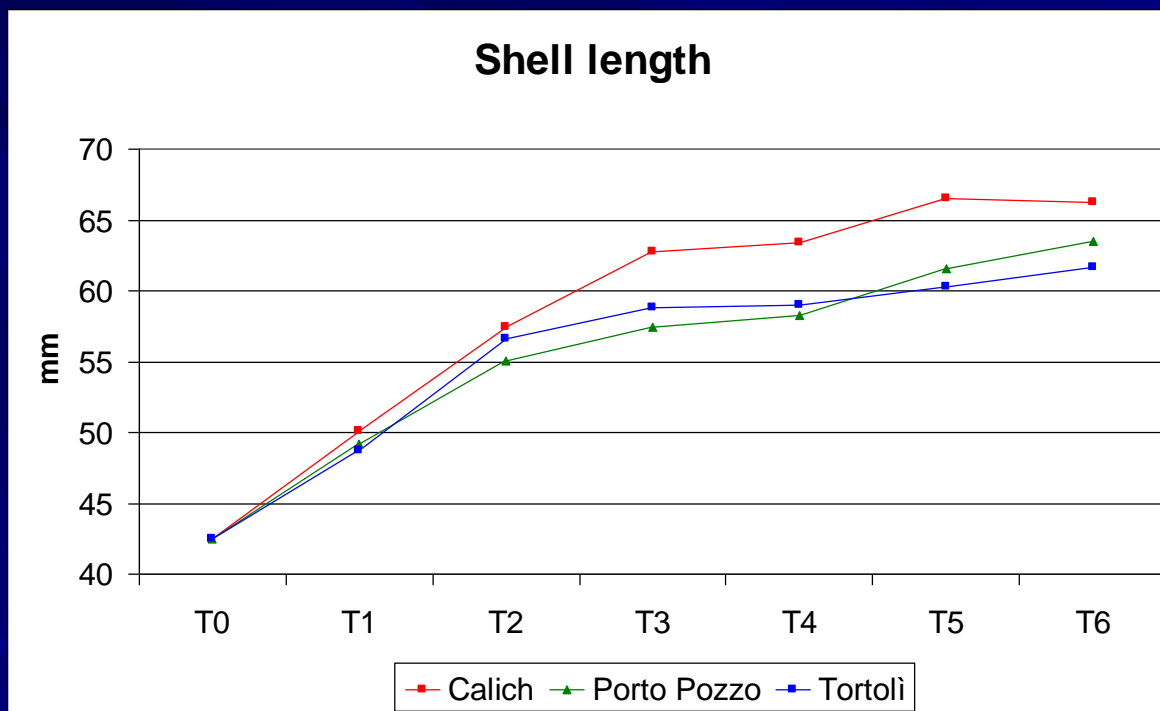


Calich lagoon had higher levels of seston in July, August and September

Results

Morphometric variables

Site		Shell lenght
Calich	mm	66.2 ± 4.7
Porto Pozzo	mm	63.5 ± 3.2
Tortoli	mm	61.6 ± 2.7

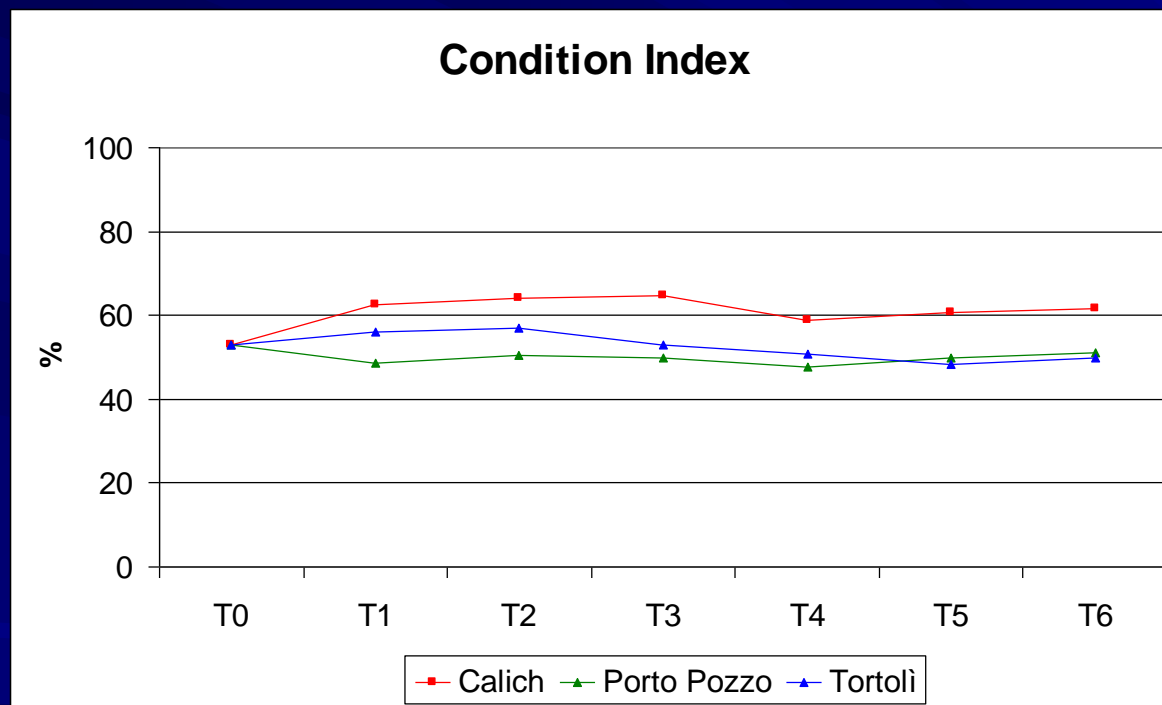


Significantly higher in mussels from the Calich lagoon showed a mean shell length (66.2 ± 4.7 mm; $p < 0.001$) than those from Porto Pozzo (63.5 ± 3.2 mm) and Tortoli (61.6 ± 2.7 mm).

Results

Morphometric variables

Site		Condition Index
Calich	%	60.9 ± 5.3
Porto Pozzo	%	51.4 ± 3.9
Tortoli	%	49.4 ± 4.4



Mean CI value was significantly higher in Mussels from Calich lagoon (60.9 ± 5.3 ; $p < 0.001$) than in those from Porto Pozzo (51.4 ± 3.9) and Tortoli (49.4 ± 4.4).

Conclusions

- Mussels showed a good growth in all sites studied
- Mussel in Calich lagoon showed the best performances due to its high level of suspended matter.
- The Condition Index was pretty good in all the group examined, but significantly higher in the specimens from the Calich lagoon
- In August mussels showed a growth stop supposedly due to high temperature in previous month