Diversity of pathogens of molluscs in Mexico and surveillance tools

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Brest, 26-28 November 2019

Agenda

Introduction

Main species for commercial production

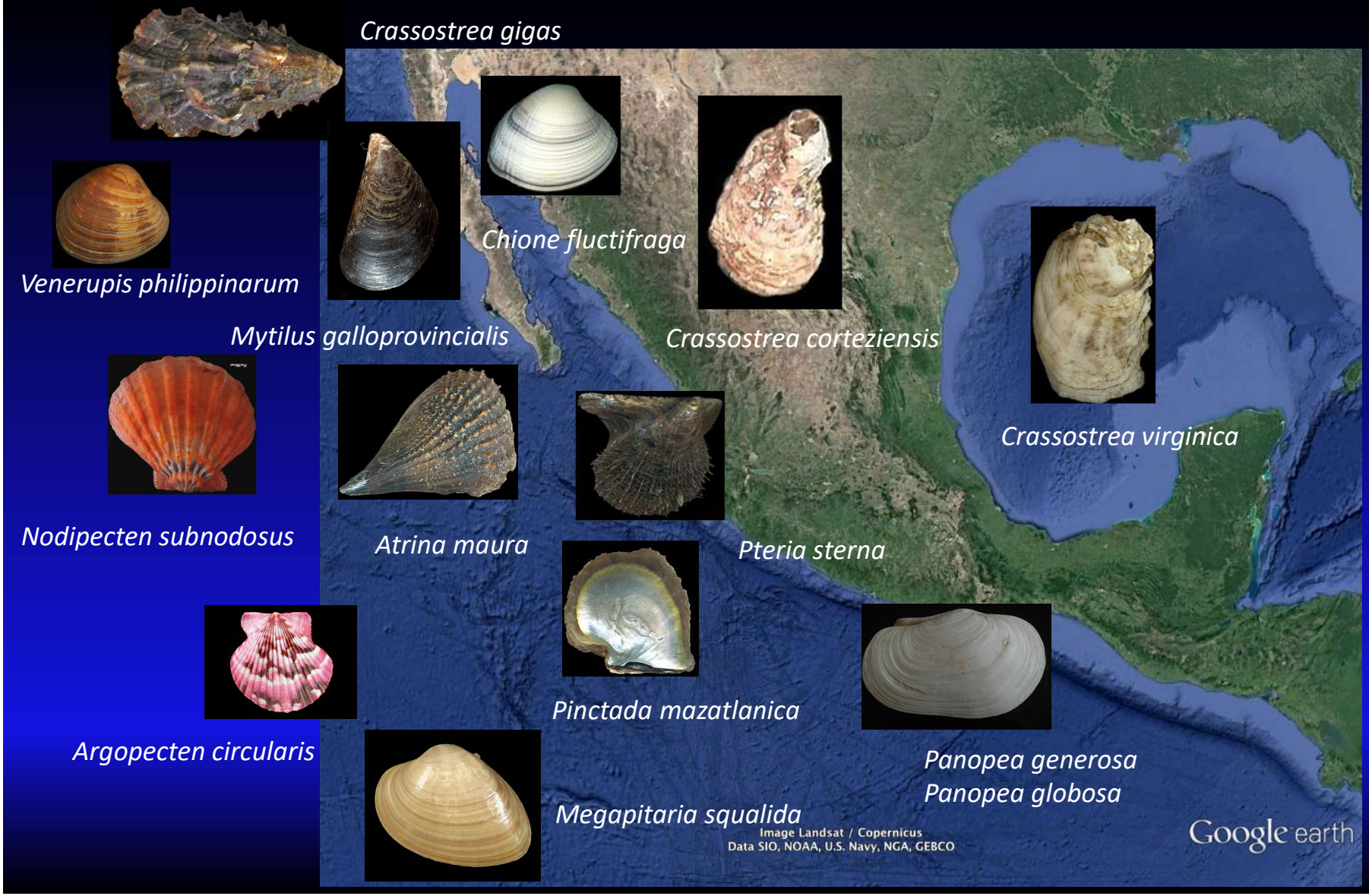
Diversity of pathogens, main diseases and surveillance tools

Challenges for surveillance

Conclusion

Agenda

Species of aquaculture significance



Main species that support commercial production

Eastern oyster *Crassostrea virginica:* fishery and extensive aquaculture

Pacific oyster *Crassostrea gigas* : aquaculture

Cortez oyster *Crassostrea corteziensis*: fishery and extensive aquaculture

Kumamoto oyster *Crassostrea sikamea*: aquaculture

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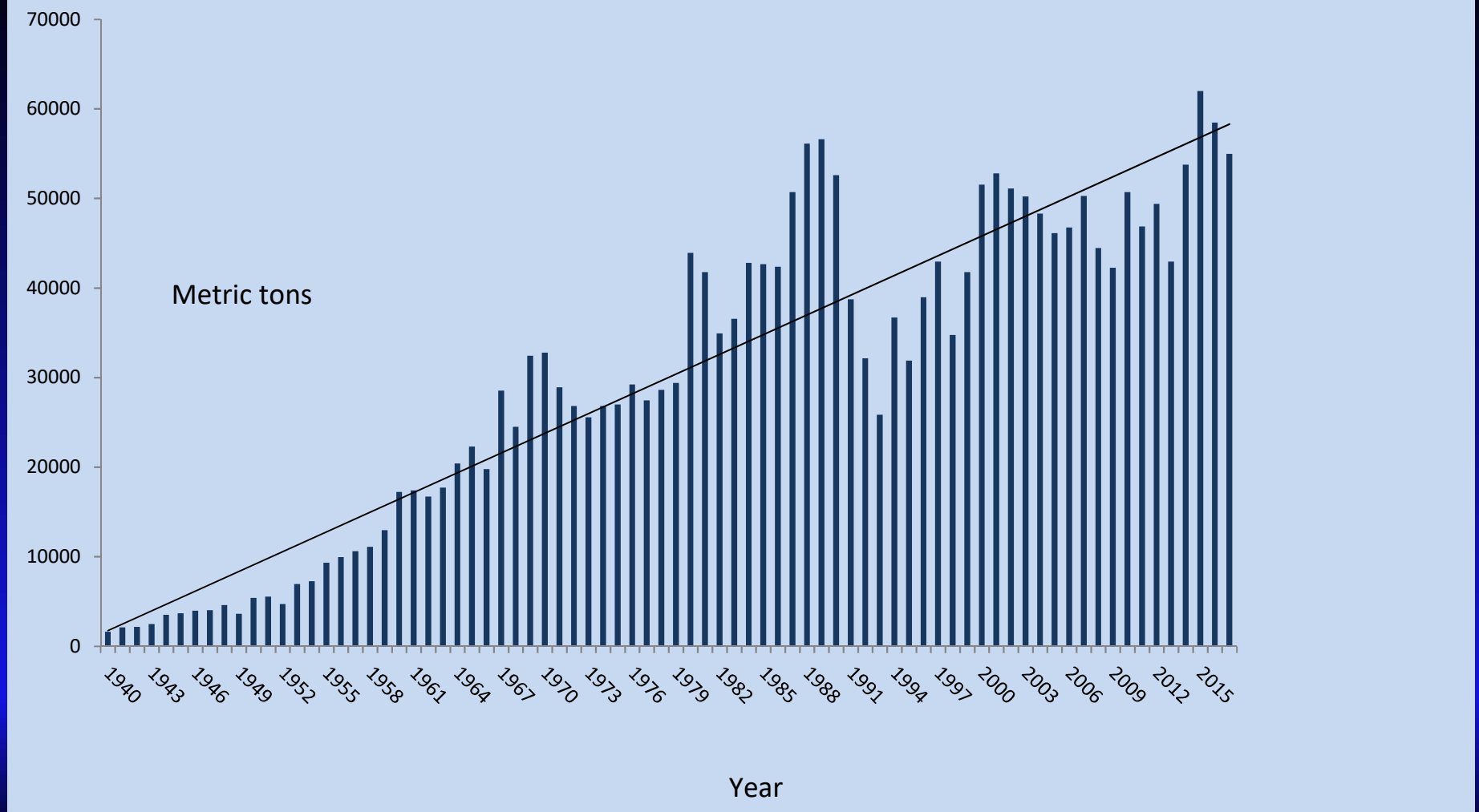
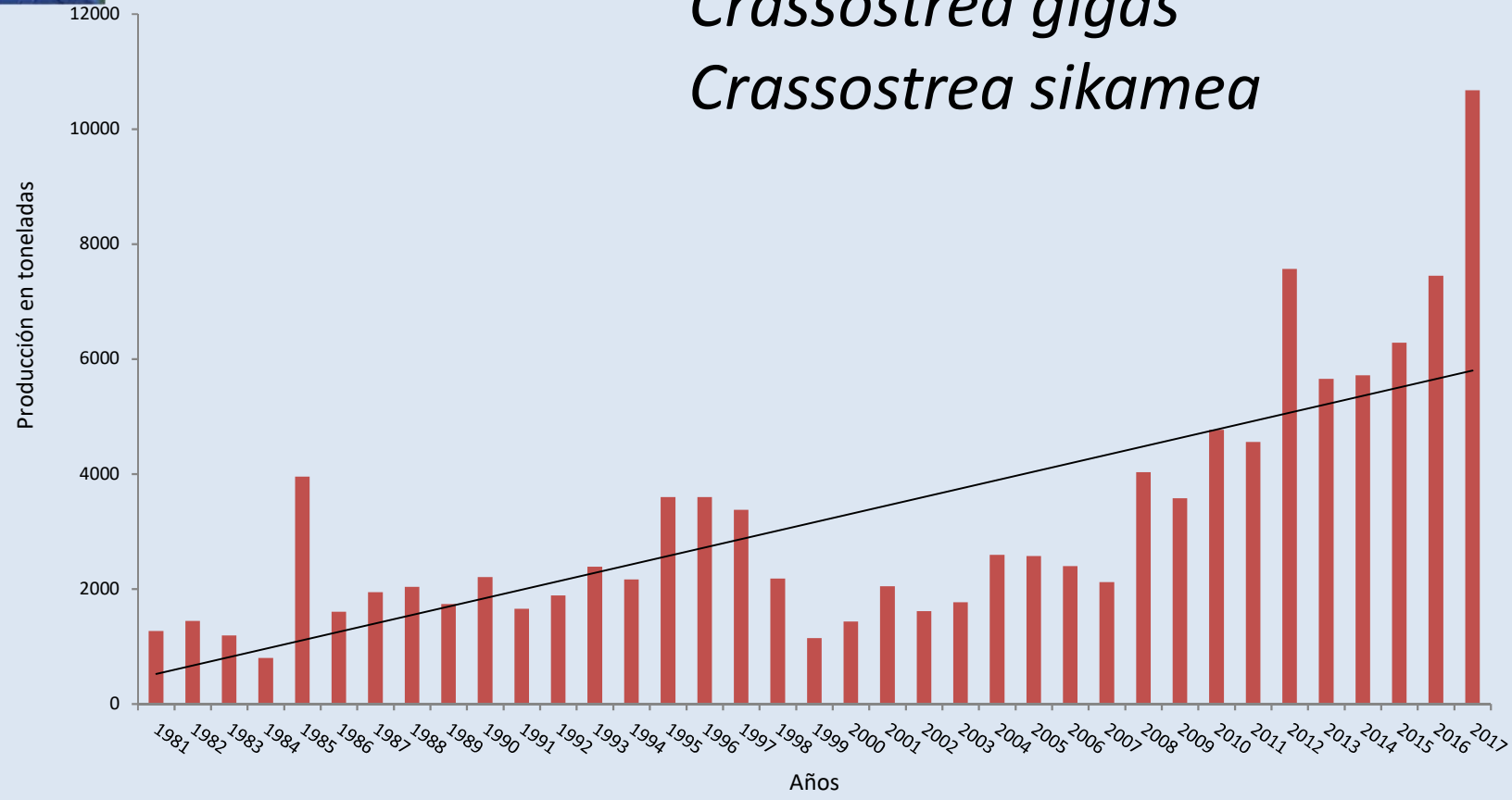
Oyster production in Mexico since 1940

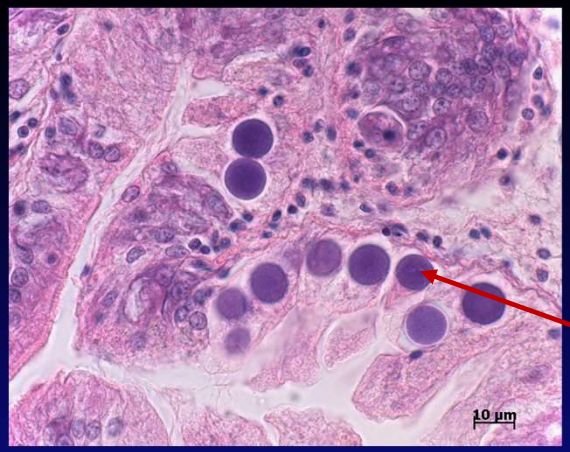


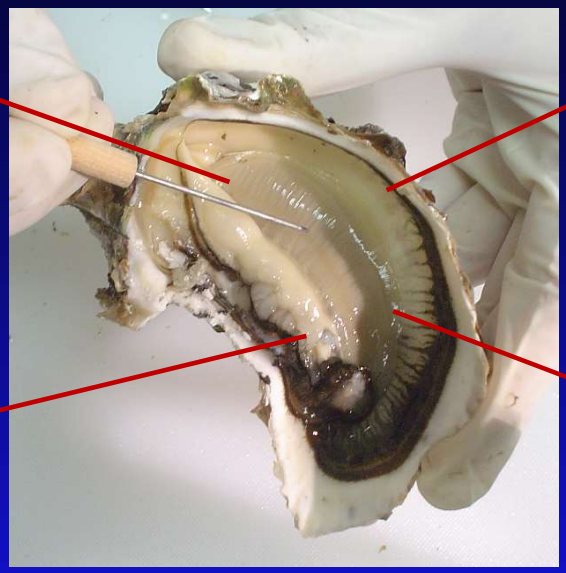
Aquaculture production of oysters in Northwest Mexico 1981-2017

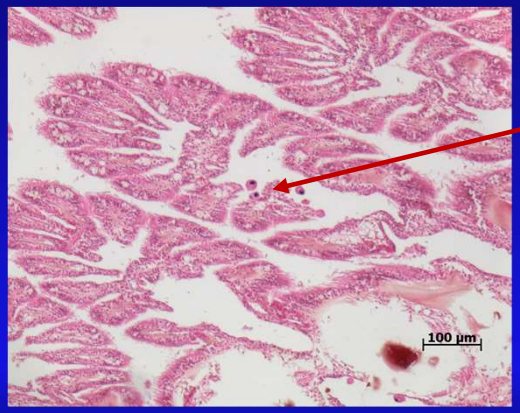
Crassostrea corteziensis
Crassostrea gigas
Crassostrea sikamea



Diversity of pathogens, main diseases and surveillance tools







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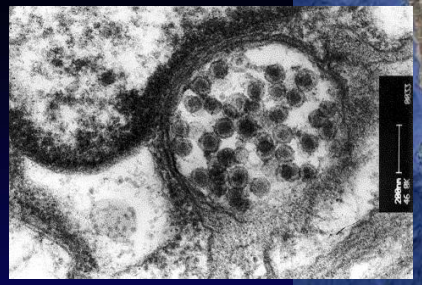
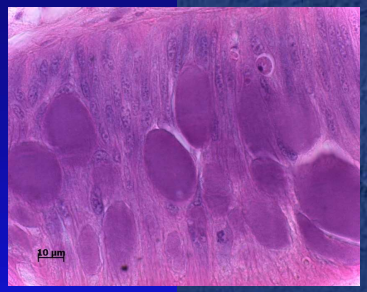
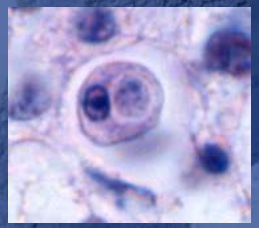
Diversity of pathogens in molluscs of Mexico

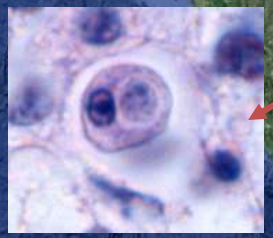


Ostreid herpesvirus (OsHV-1)
local varieties



Candidatus Xenohaliotis californiensis
Monomorphic
Abalone species





Perkinsus marinus
Same varieties

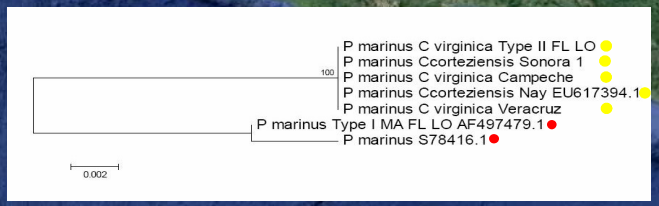
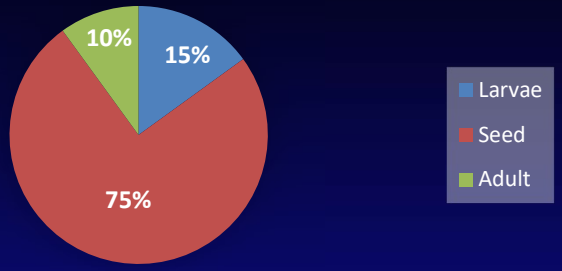


Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

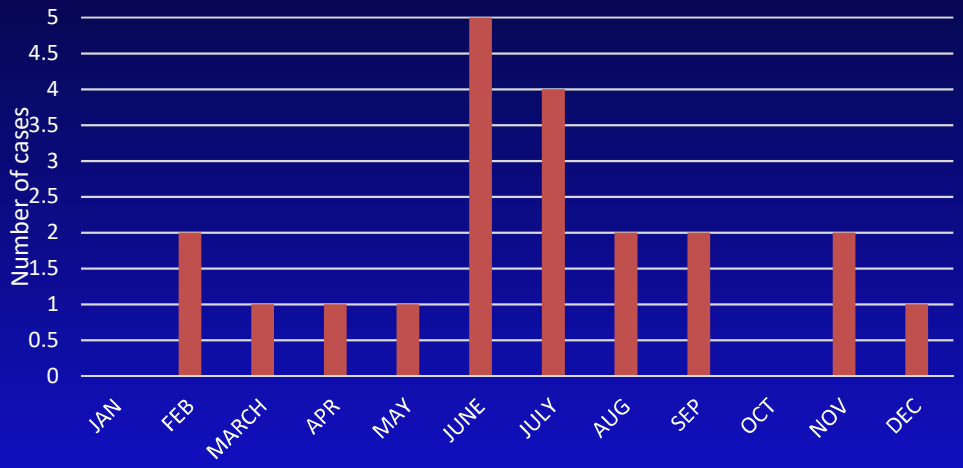
Oyster herpesvirus

OsHV in Baja California

Percentage of cases per stage

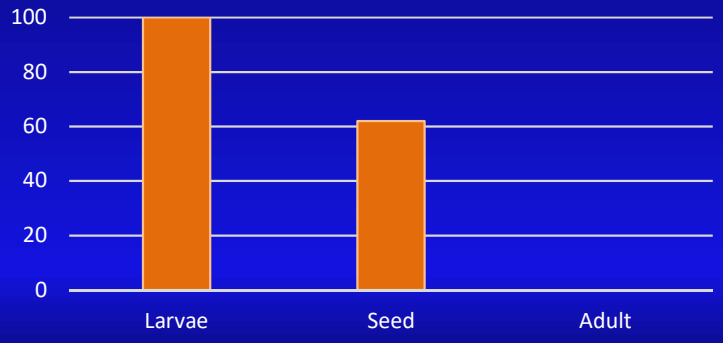


OsHV-1 (2002-2017)



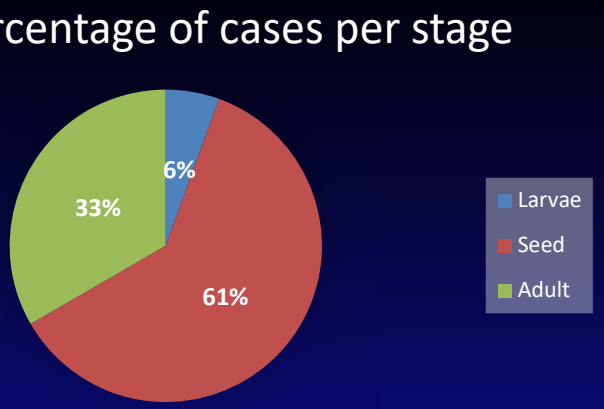
Larvae: up to post-larvae
Seed: 5 -40 mm
Adult: 〉 40 mm

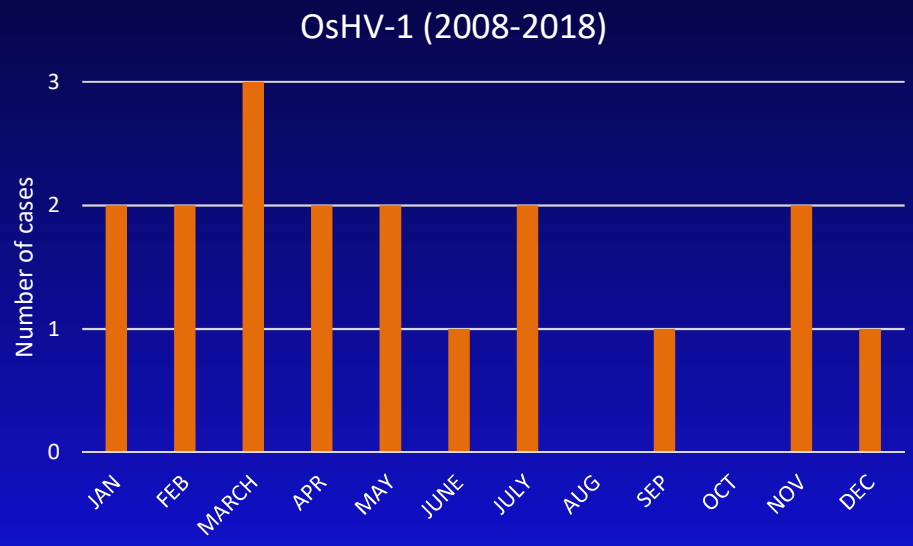
Mean percentage of mortality per stage

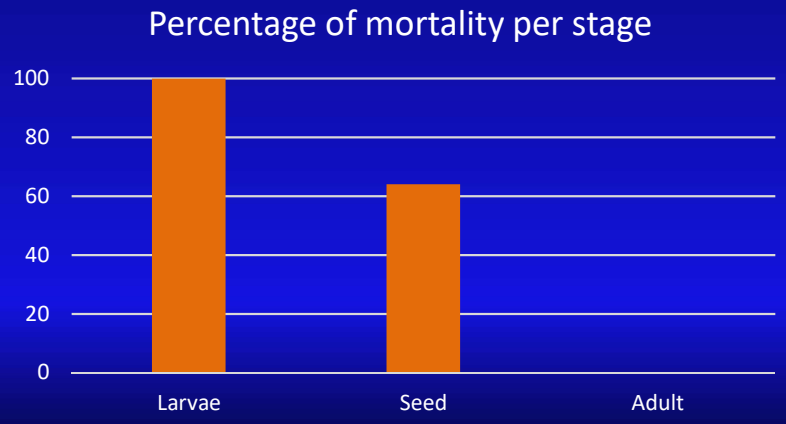


Range: 10-100%

OsHV in Baja California Sur

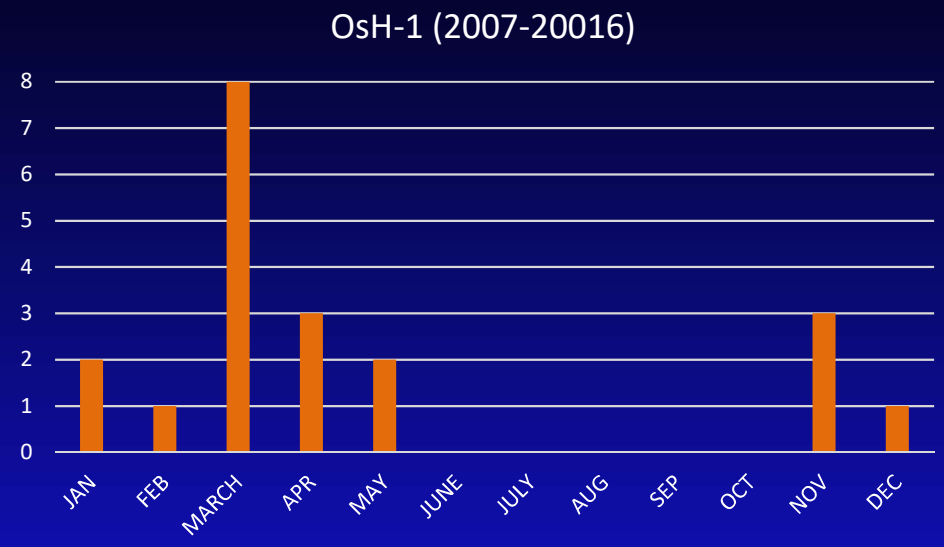






Range: 64-100%

OsHV in Sonora

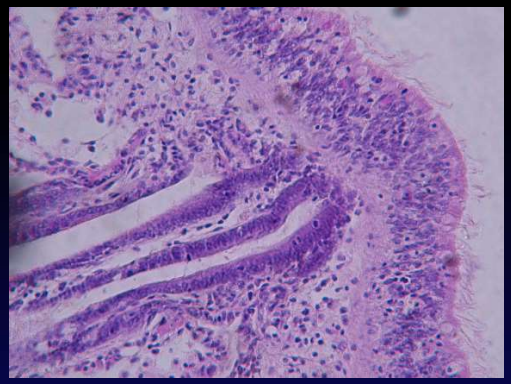


Larvae 100%
Mean mortality of seed 64%

Range: 60-100%

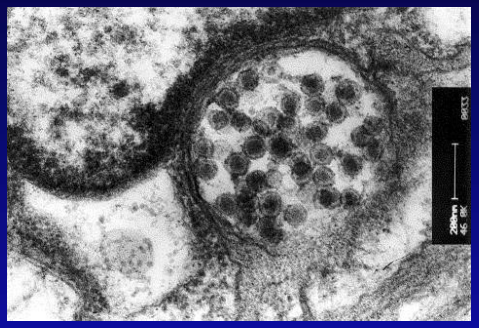
Diagnostic tools

Histology



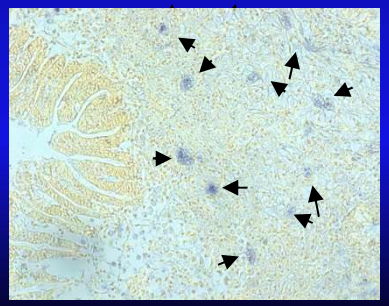
Fresh analysis

MET 4

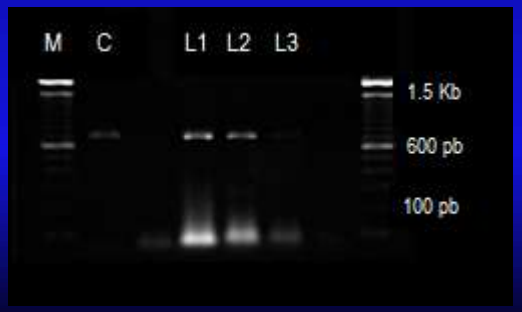


Unusual mortalities

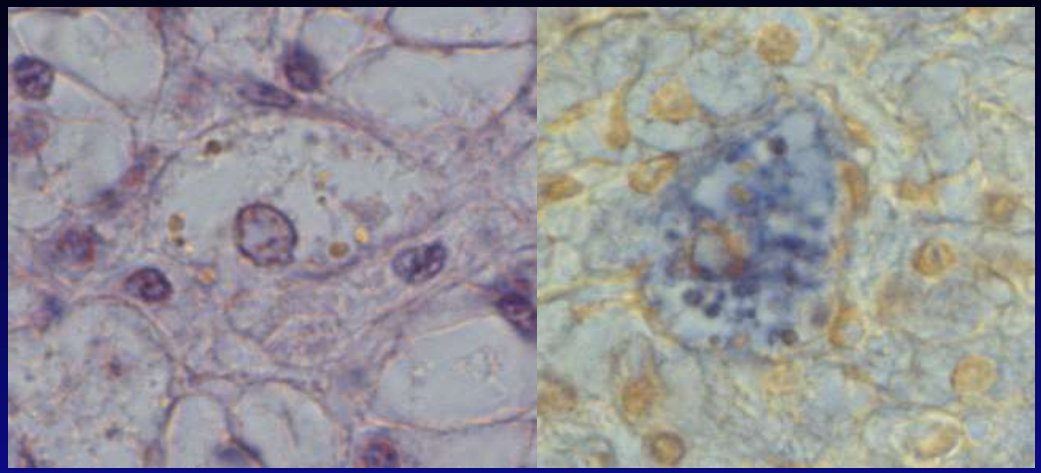
HIS



PCR, RT-PCR sequencing



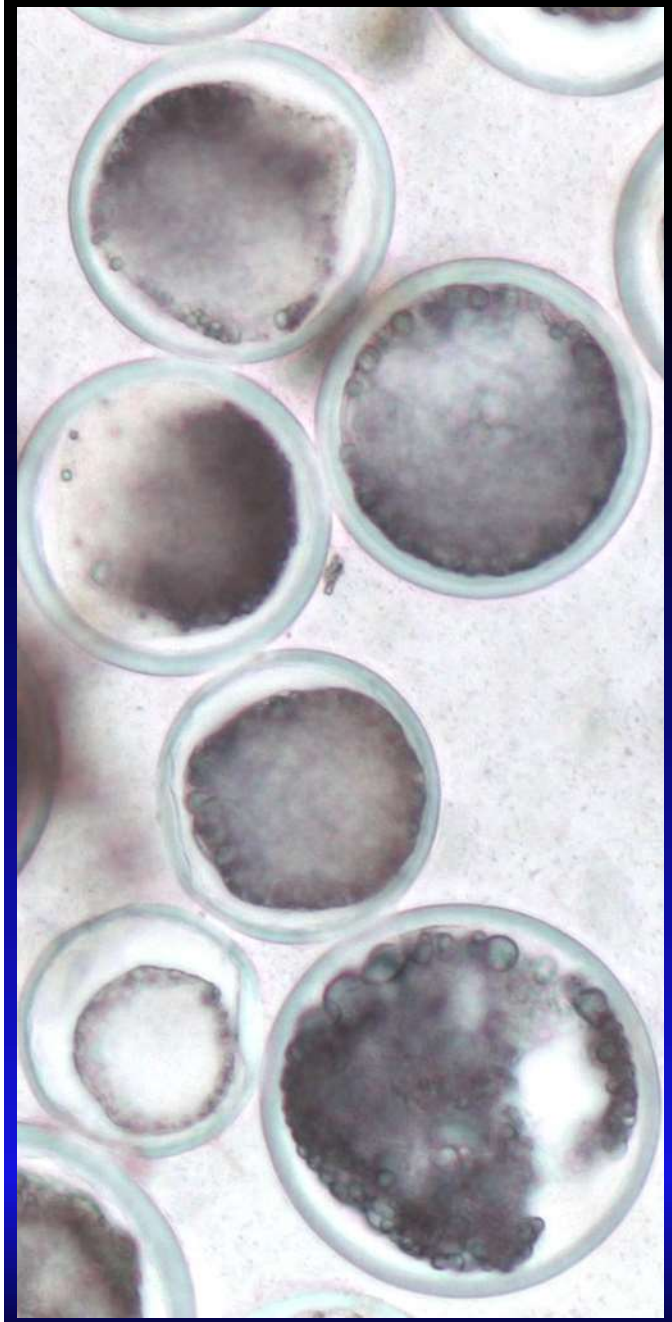
It is not enough to have an ideal surveillance technique if the interpretation is wrong



Presence of DNA of a particular parasite in one host do not means the presence of a living parasite or infection

Presence on one particular parasite alive in a host do not mean, necessarily infection

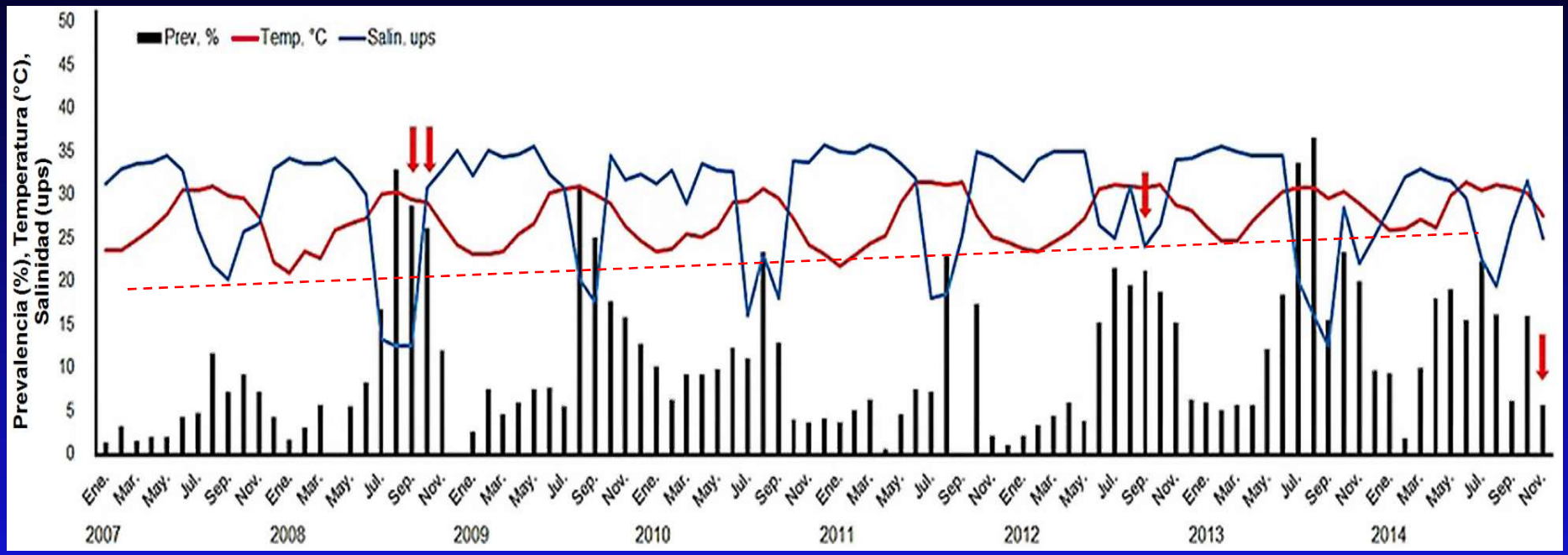
Presence of an infection related with a particular parasite do not mean necessarily mortality



Perkinsus marinus

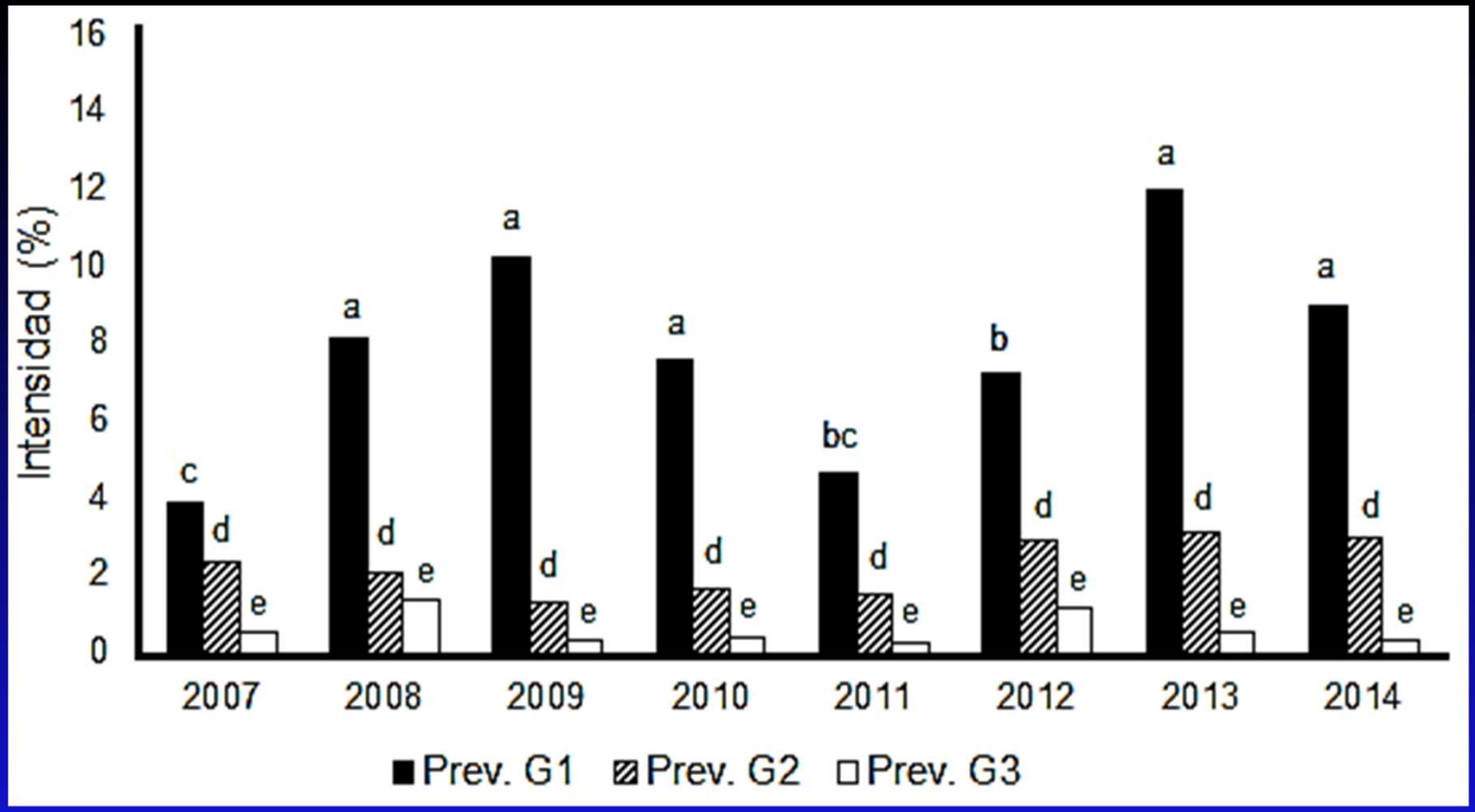
Perkinsus marinus in *Crassostrea corteziensis*

Prevalence



Seasonal pattern associated with temperature and salinity

Intensity



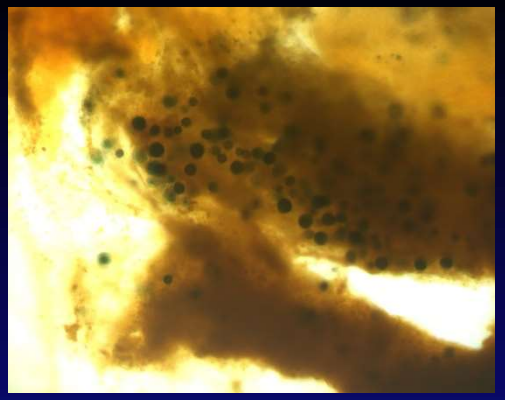
Predominant intensity: light

Severe cases less than 10%

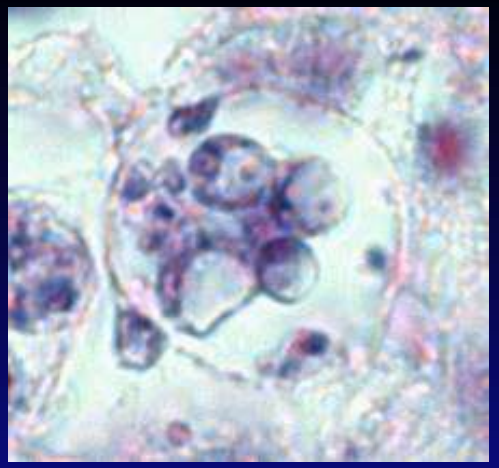
No unnusual mortaliy during study

Diagnostic tools

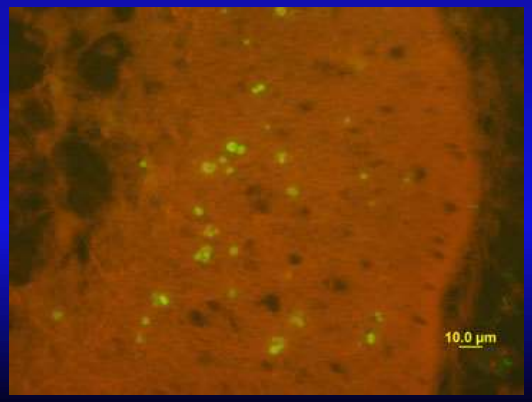
FTM



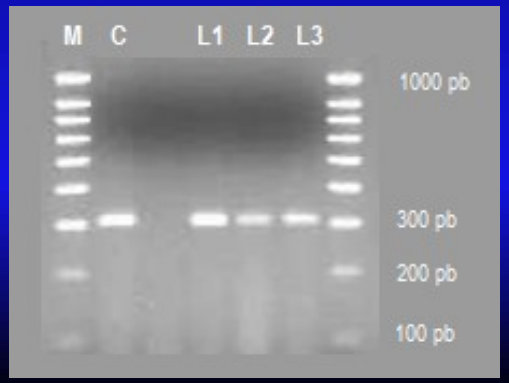
Histology



HIS



PCR, RT PCR-sequencing
ITS, NTS



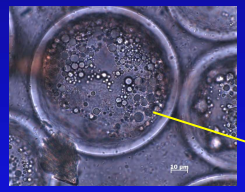
It is not enough to have an ideal surveillance technique if the interpretation is wrong

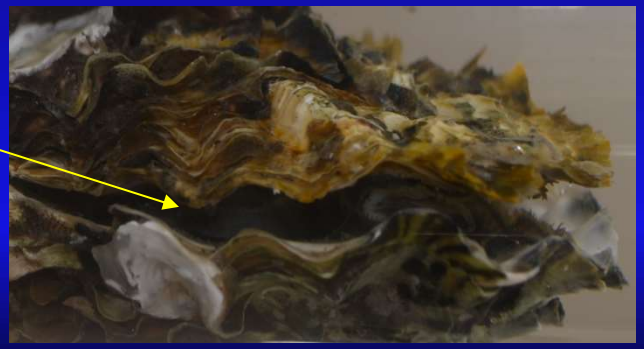
For more than 20 years of surveillance in *Crassostrea gigas* we have not detected any cases of development of the infection with the histological technique

However, some cases of detection of *P. marinus using* PCR has been positives

In our lab studies, injecting hypnospores in healthy oysters no infection was detected

Surveillance is needed as a carrier





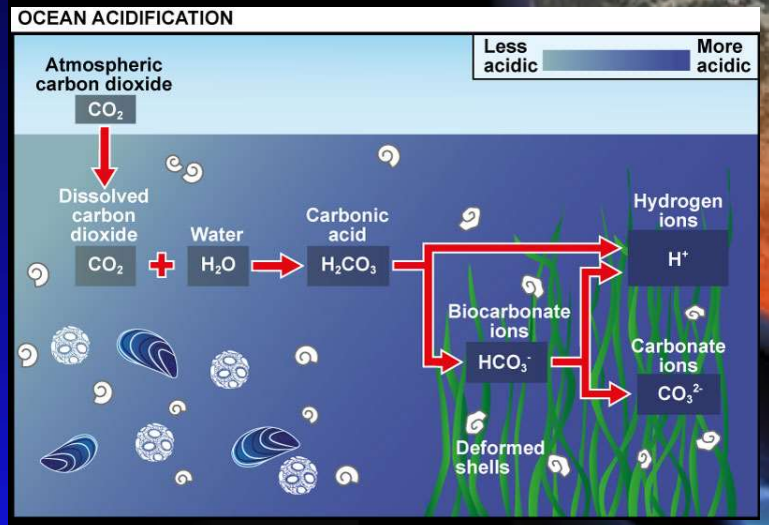
Challenges for surveillance

THE WORLD POPULATION REACHED 7,500 MILLION PEOPLE IN 2019

Agenda

7,500 MILLION PEOPLE!

Climate change and ocean acidification



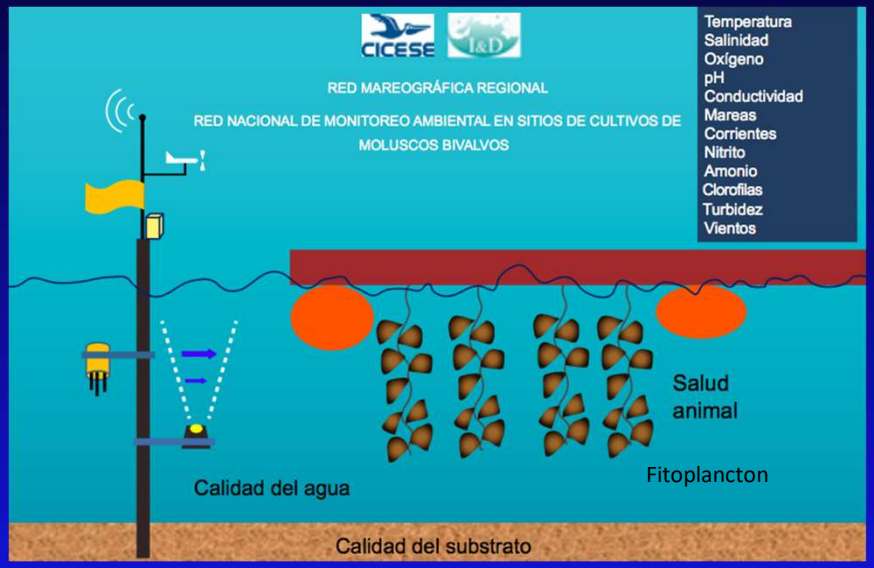
Increase of diseases is expected

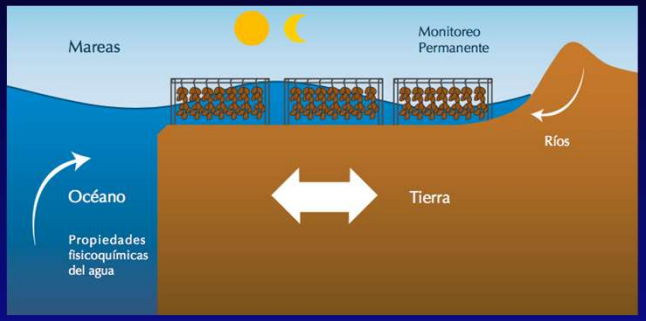
Increasing the surveillance efforts

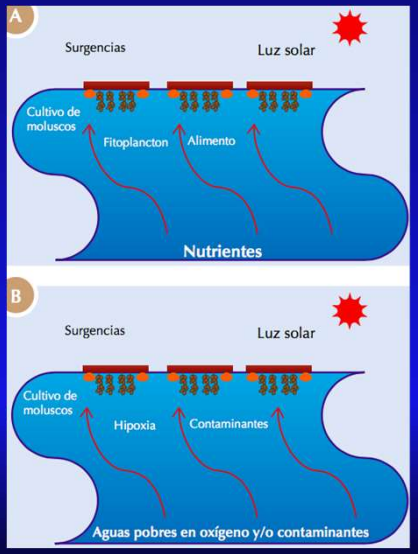
Prevention and Surveillance

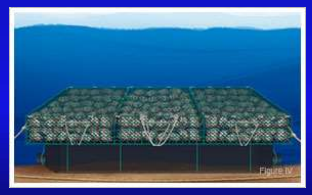
Permanent environmental monitoring in growing areas

Association with infectious and non-infectious diseases



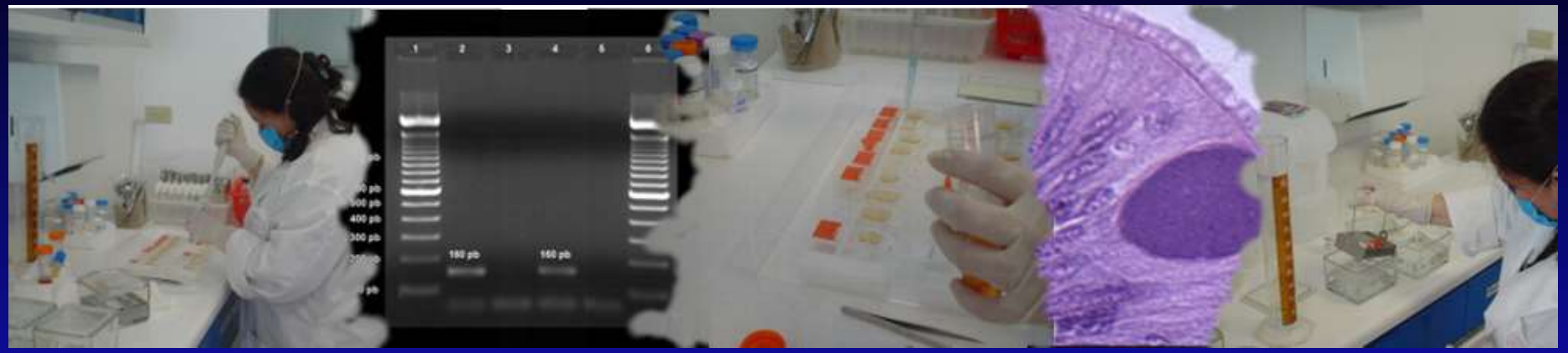






Conclusion

Adequate diagnostic tools and correct interpretation

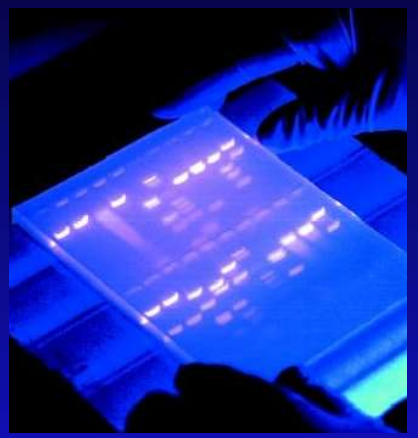


CICESE

Thanks!

New oyster pathogens

Genomics



GATACCATTAGGCCTTGGTTGA

Confirmation by PCR, RT-PCR and sequencing


60 AÑOS
OSPESCA
MANUAL DE BUENAS PRÁCTICAS DE
MANEJO PARA EL CULTIVO DE
MOLUSCOS BIVALVOS
Autores:
Jorge Cáceres Martínez y Rebeca Vásquez Yeomans
2014