



Primary
Industries

Pacific Oyster Mortality Syndrome

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POMS

- What is it
- What happened in NSW
- What has NSW done about it
- What is planned in NSW
- What has happened elsewhere (Europe & NZ)
- What might farmers do

POMS (OsHV)

- No human health impact
- Classic Ostreid herpes virus (OsHV-1) known since 1991 in Europe, some impacts on PO production
- Herpes-like viruses in Aust (angasi, SRO, PO and clams)
- France 2008: Severity of mortality events increased, Ireland & UK 2009
- Variant strain (OsHV-1 μ var) identified & and most common
- French & NZ strains similar, Chinese & Japanese strains are also closer to OsHV-1 μ var than classical OsHV1

OsHV1 μ var

- PO mostly, but has been assoc with other species
- Horizontal transmission – vertical transmission
- Asymptomatic carriers
- Triploid vs Diploid
- Hatchery vs Wild
- Mutation??? DS DNA virus (relatively genetically stable)

Biotic	Oyster	Species	Only PO sensitive (triploid/dilpoid) Other species may become infected without any mortalities Other species may act as reservoir
		Age/maturity	Spat and Juvenile more sensitive
		Genetics	Rapidly growing more sensitive Evidence of decreased mortality in some family lines in breeding trials Resistant oysters strain is being created in France (breeding programs)
	Pathogen		OsHV1 μ var presence (necessary but not sufficient) Co-infection with other pathogens: <i>Vibrio</i> spp. and various parasites
		Salinity & Density	No direct evidence in Europe
	Abiotic	Temperature	Outbreaks rare/null below 16-18°C, sudden temp rise
Oxygen		Associated with phytoplankton bloom	
Water quality		Nutrients	Quality/quantity algae and nutrients (direct or indirect effect)
		Pollutants	May impair immune system of oysters
Sediment quality		Quality – quantity of organic matter in the water column	
Depth		Intertidal oysters less affected	
Proximity		Remote oysters are less affected	

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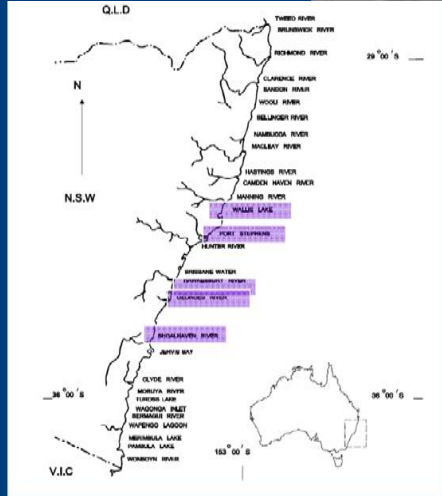
Diagnostics

- No characteristic gross signs
- PCR: very sensitive and highly specific
 - Associated and nonviable virus
 - Several tests are currently in use
 - Validation is needed
 - OIE Manual
- Histology (tissue examinations)



NSW 09/10: 612,553 Doz (\$4.5m) \$7.36

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Georges R.

- Late Nov 2010: Unexplained mortalities reported in 4mm-15cm farmed & wild PO; poor WQ
- Fish kill protocol initiated (joint NSW DPI & DECCW response)
- Oyster & water samples to DECCW lab, oysters to DPI lab (EMAI)
- WQ results = no significant contamination
- Initial histo = inconclusive but acute inflammation



POMS – Georges R outbreak (cont)

- Early Dec: Additional samples = inflammation (dig gland, gills, gut) but no etiological agent id'ed by histo
- Mid Dec: EMAI sourced PCR reagents for OsHV-1 from O/S and undertook testing; not validated, no +ve control = results considered preliminary
- Late Dec: samples sent to Aust Animal Health Lab (AAHL)
- Early Jan 2011: PCR result confirmed as OsHV-1 uvar

POMS response – NSW decisions

- No previous confirmed reports of OsHV-1 in Aust; emergency response activated
- Refer to as “POMS” due to reported impacts of misinformation on seafood sales in NZ; Xmas peak = confidentiality VIP
- Permit conditions applied to control movements from affected estuary (sales for consumption OK’ed to continue)
- Long-standing ban on rec harvest in affected estuary

Established systems in NSW

- Mandatory reporting of unexplained mortalities >5%
- Mandatory reporting of inter-estuarine movements (easily searched database & paper trail)
- All lease areas mapped in GIS; random sampling via GPS
- NSW DPI covers costs for exclusion of Notifiable Diseases
- Industry confidence in EMAI (service reliable, quick turnaround)

POMS – NSW surveillance plan

Location	Number triploid PO samples	Number Wild PO samples	Number SRO samples (*excludes Syd Hbr)	Total PO samples to be collected
Hawkesbury	155	155	155	310
Port Stephens	155	155	155	310
Wallis Lake	155	155	155	310
Shoalhaven	155	155	155	310
Control estuaries (Sydney Harbour, Clyde R)	0	310	155*	310
TOTAL SROs (to be archived)			775	
TOTAL PACIFICS				1550

NSW – Syd Harbour reconnaissance

- Syd Harbour/Parra R chosen as control for surveillance
- Not farmed so no maps available showing oyster areas
- Reconnaissance to scope PO pop'n mid Jan 2011
- Mortalities observed, samples taken, confirmed OsHV1uvar
- Syd Harbour/Parra R not included in surveillance

Farmer workshops

- Situation reports, Science, alternate species
- Financial support services (Rural Financial counsellors)
- Financial Hardship (DPI, Food Authority, LPMA, Council, Centrelink)
- Social support services (Rural support workers, Rural financial Counsellors & Centrelink)
- Additional Programs (Climate Change Adjustment, Waste levy exemptions, Business Cluster Support Schemes, Environmental Trust Grants).
- Responsibilities

Best Practice

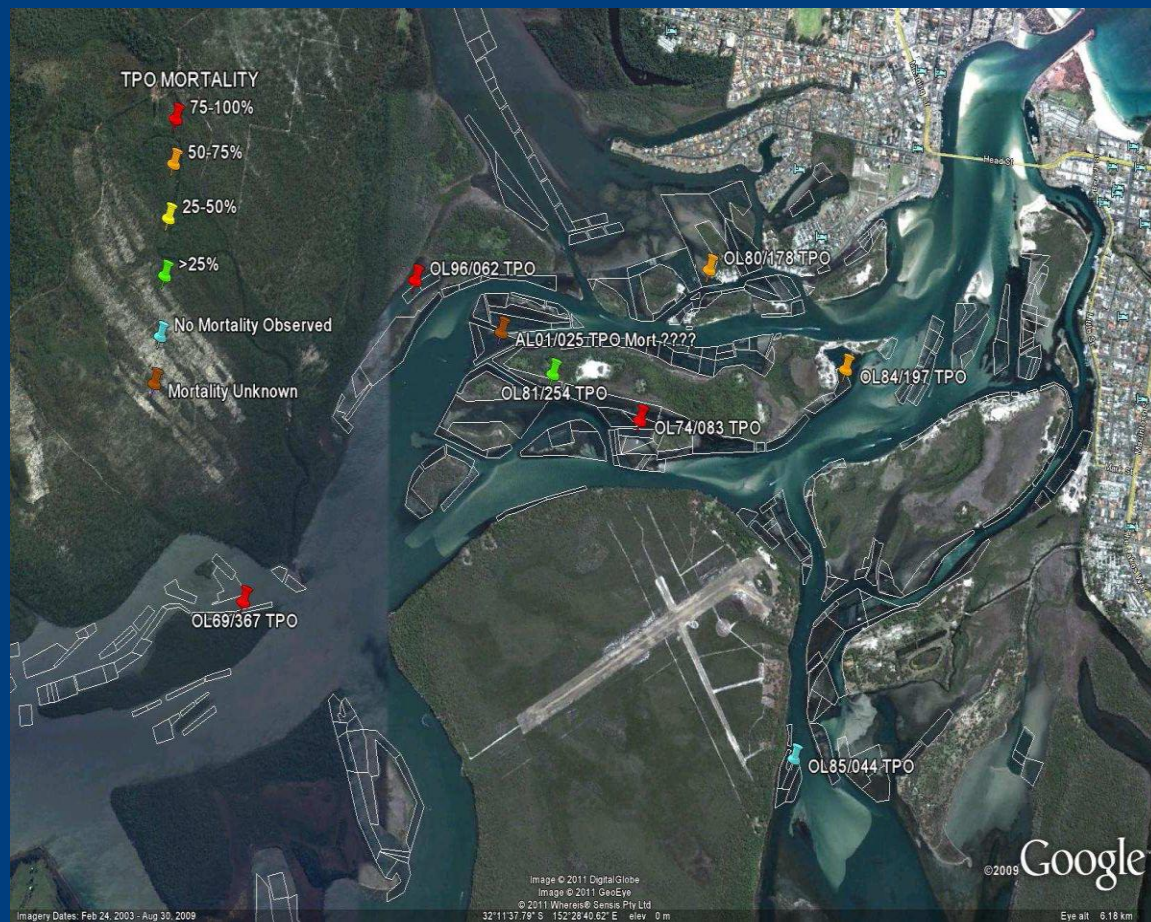
- Key principles
- Movement controls
- Minimising stress on stock
- Separation of equipment/stock
- Decontamination/cleanliness

DPI best practice manual (research and sampling)

NSW – POMS investigations

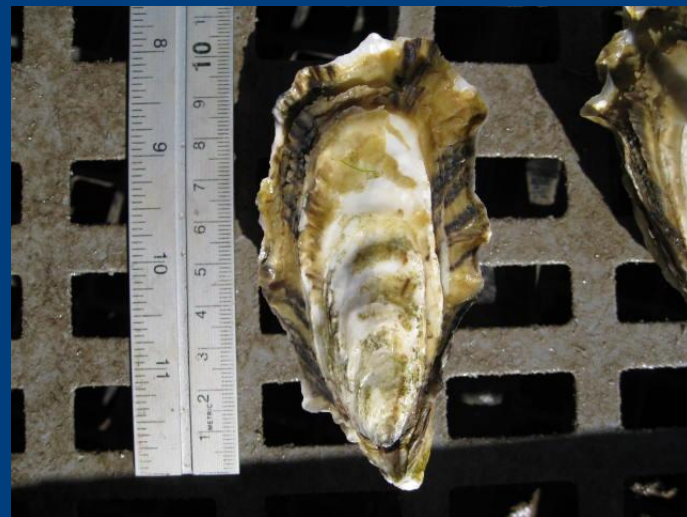
- Georges R mortalities continued for months, up to approx 90%
- Wild and farmed pop'ns sampled in Georges R & Botany Bay
- Naïve 3POs translocated into Georges R – infection 6 days later, mortalities 10 days later
- 3N PO in all estuaries tested
- Mortalities reported in farmed POs in Shoalhaven R Jan & Wallis Lake Feb-Mar, no evidence of OsHV1
- Selected PO broodstock translocated into GR – evidence of resistance
- Investigation continuing (3500 oysters tested to date)

Wallis Lake



Research

- ASI, CSIRO
- 20 ASI families (n=30)
- Woollooware Bay, Trays, cheek by jowl
- PCR
- Two trials
 - 1: April (3 samplings)
 - 2: June (2 Samplings)
- Preliminary !!!!!



Trial 1



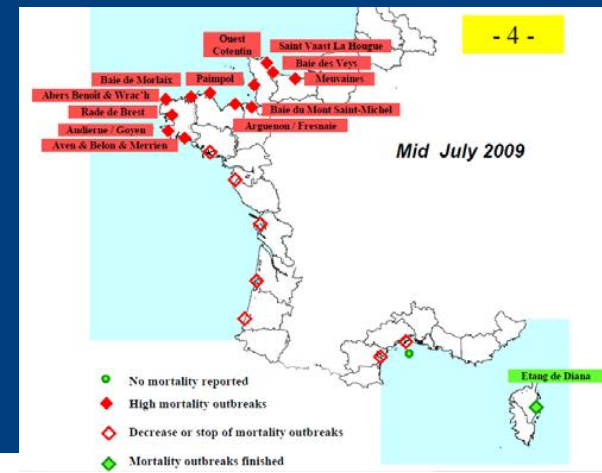
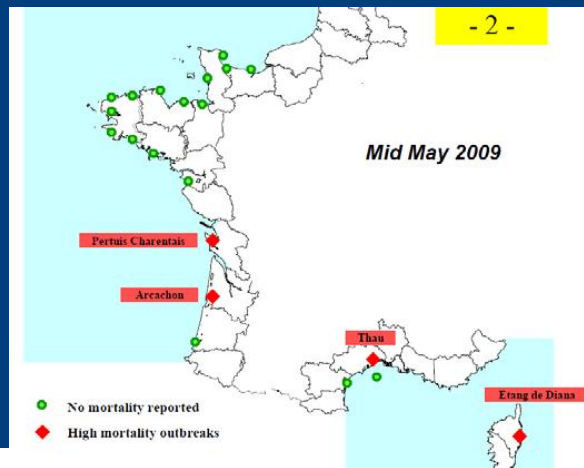
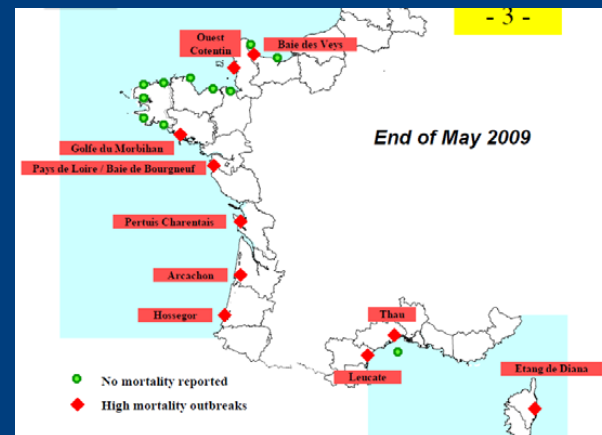
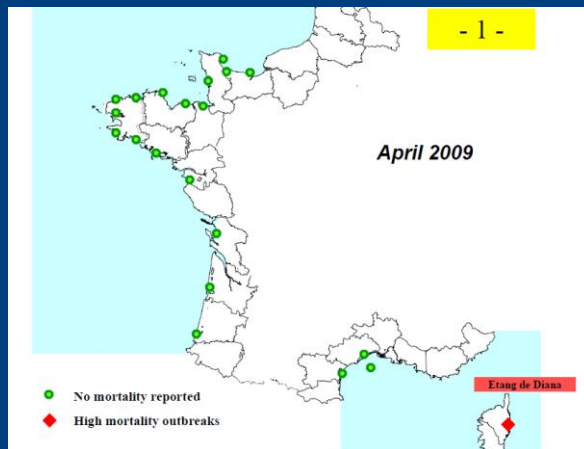
Trial 2

N= 600 1weak +ve

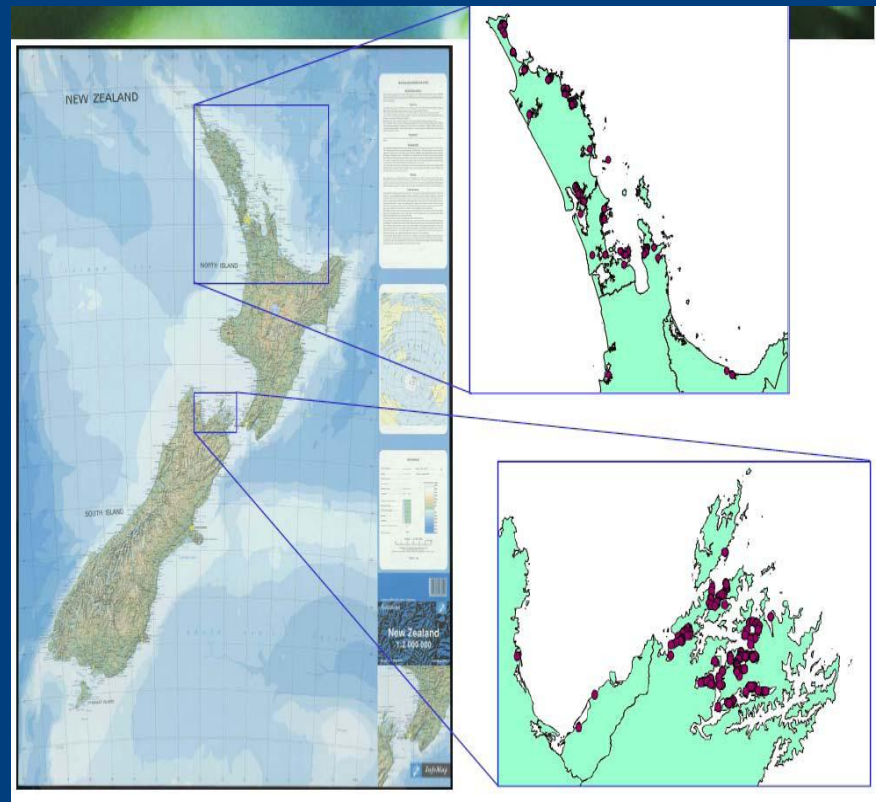
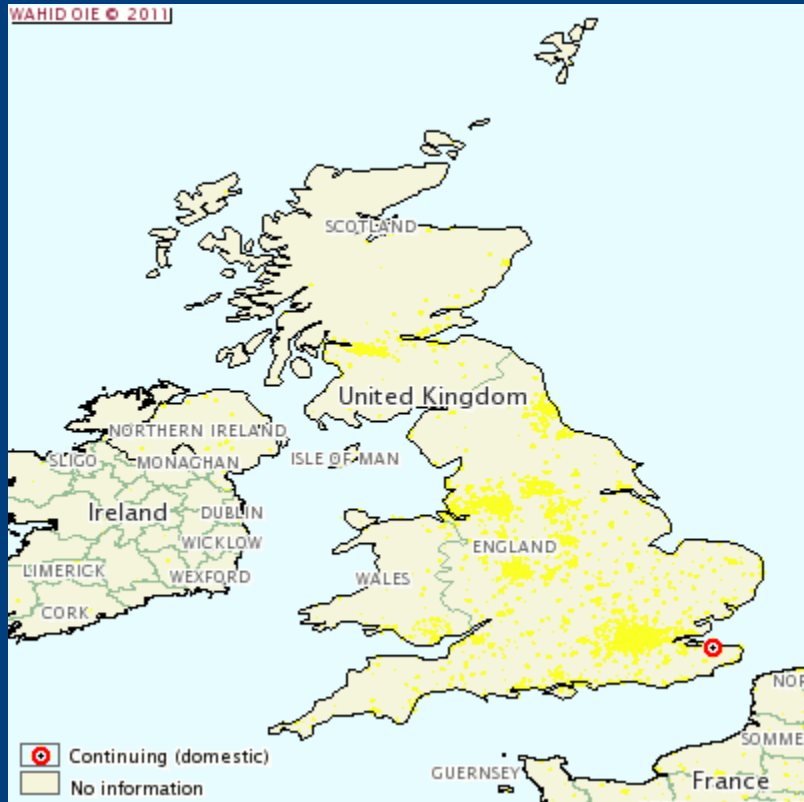
Future Research

- Industry study tour
- RW (USyd) FRDC - Investigate the effect of host, environmental and husbandry factors on POMS during summer 2011-autumn 2012, with the objective of discovering aspects of the epidemiology which can be manipulated or influenced to reduce economic losses.
- I&I (EMAI, PSFI) Continued monitoring of GR with view to elaborate key factors (size, age, temperature, spatial variability...)
- Develop an infectivity model
- Final assessment of ASI line resistance trials

France



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Responses

- ❑ Breeding for resistance
- ❑ Use of alternative resistant species
- ❑ Growing hatchery spat to a larger size before stocking
- ❑ Avoiding stock susceptible animals during periods of warmer water temperature
- ❑ Stocking larger numbers of spat to compensate for the expected losses
- ❑ Emergency harvest in the face of possible outbreaks