A long term study of bonamiosis in Quiberon bay, France

I. Arzul*, L. Miossec, E. Blanchet, C. Garcia, J.P. Joly, C. Francois and F. Berthe

*Community Reference Laboratory of Mollusc Diseases - OIE reference laboratory for bonamiosis and marteiliosis - IFREMER - 17390 La Tremblade FRANCE
iarzul@ifremer.fr
Introduction

- The flat oyster *Ostrea edulis* was the flagship of the Breton oyster production until two diseases due to the protozoans *Bonamia ostreae* and *Marteilia refringens* spread in the 1970’s.
- These diseases drastically reduced the flat oyster production from nearly 20,000 t per year in 1970 to less than 2,000 t nowadays.
- Losses were estimated at about 20% of employment, 240 millions US$ of turnover and 200 millions US$ of added value between 1980 and 1983.
Introduction

- The protozoan *Bonamia ostreae* was first reported in June 1979, in oyster farms of Tudy Island, Brittany, in association with abnormal mass mortalities (80-90%) (Pichot et al., 1979).

- During the following months, the same parasite was detected in all the Brittany farming centres and then has rapidly spread to most European oyster stocks (both reared and wild).

- The introduction is believed to have occurred with transfers of flat oysters, *Ostrea edulis* moved from California to France and Spain.
Aims of the study

- To draw an updated and dynamic picture of the French flat oyster production from data collected during the national shellfish culture census carried out in 2002 in France.

- To study the evolution of the disease in an endemic area (Quiberon Bay, Brittany) from pathological data collected between 1980 and 2004.
Flat oyster spat production (2000):

- 99.4% of spat is naturally collected on limed tiles or bags of mussel shells.
- 2.2 \(10^6\) units are produced by 3 hatcheries in 2000.
- All the Brest spat production and 1/3 of the Quiberon bay spat production is moved to Cancale, North Brittany, when spat is 10 months.

2001 data from national census (Agreste)
Flat oyster marketing (2001):

1,653 tons

Main production areas, including marketing

Marketing areas

Adult flat oyster transfer before marketing

2001 data from national census (Agreste)

Do not disseminate without author authorization
The French flat oyster production is located in few specialised areas:

- 2 spat collection areas: Brest and Quiberon bays
- 2 growth areas: Quiberon and Cancale
- 4 main marketing areas: Cancale, Belon, Golfe du Morbihan and Arcachon

The French flat oyster production implies transfers:

- Spat is moved from Brest or Quiberon bays to Cancale for growth
- 83% of adults are moved from a farm to another before marketing
About 41,425 pathological data were collected in Quiberon Bay for different purposes with different sampling strategies on the period 1980-2004.

Diagnostic analysis were performed by tissue imprints (heart or gill) or less frequently by histology.

Data were analysed by year, season and age and compared with some from other important production areas.
Quiberon study: Results (1)

Quiberon study: Results (2)


<table>
<thead>
<tr>
<th>Season</th>
<th>Positive</th>
<th>Total</th>
<th>Detection frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>610</td>
<td>4663</td>
<td>0.13</td>
</tr>
<tr>
<td>Spring</td>
<td>1104</td>
<td>6908</td>
<td>0.16</td>
</tr>
<tr>
<td>Summer</td>
<td>799</td>
<td>2919</td>
<td>0.06</td>
</tr>
<tr>
<td>Autumn</td>
<td>1031</td>
<td>8201</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Detection frequencies

Do not disseminate without author authorization
Quiberon study: Results (3)

Quiberon study: Discussion (1)

Comparison with other production areas
Quiberon study: Discussion (2)

- Potential impact of temperature and salinity?
Quiberon study: Discussion (3)

- Larvae production and detection frequencies

![Graph showing larvae production and detection frequencies from 1987 to 2004.](image)

![Another graph showing larvae number from 1997 to 2004.](image)
Conclusions

- The history of bonamiosis in France highlights the risks related to transfers of live molluscs.

- However the French flat oyster production still relies on many transfers of spat and of adults before marketing.

- *Bonamia ostreae* is present in Quiberon Bay since 1980 with prevalence usually lower than 0.15. Detection frequencies present fluctuations on the studied period and seasonal fluctuations within a year.

- The host-parasite system appears stable: since 25 years, *Bonamia ostreae* seems to have adapted itself to the flat oyster production, inducing less outbreaks than in the past. The flat oyster in endemic areas seems to have developed a relative natural tolerance to the parasite.

- Data are still needed to understand the evolution and distribution of the disease...
Thanks for your attention

Acknowledgements:
Anne-Geneviève Martin & Aimé Langlade