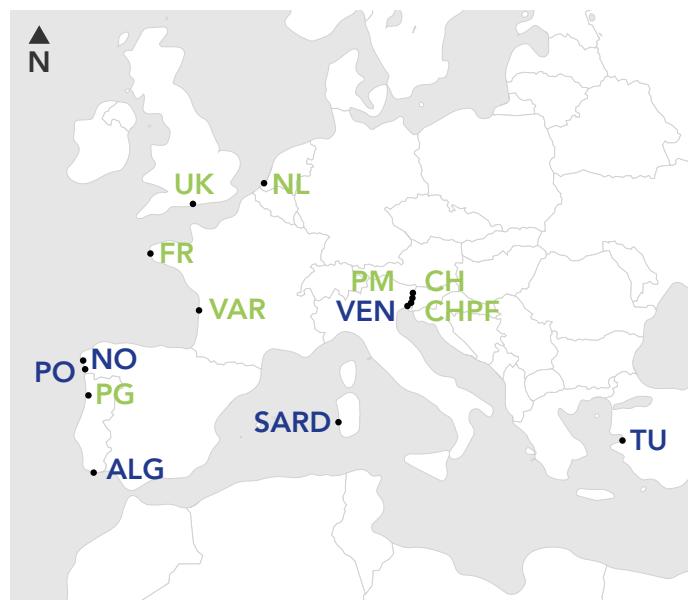


# Improving Manila Clam Resilience to Heatwaves and Disease

IGNITION

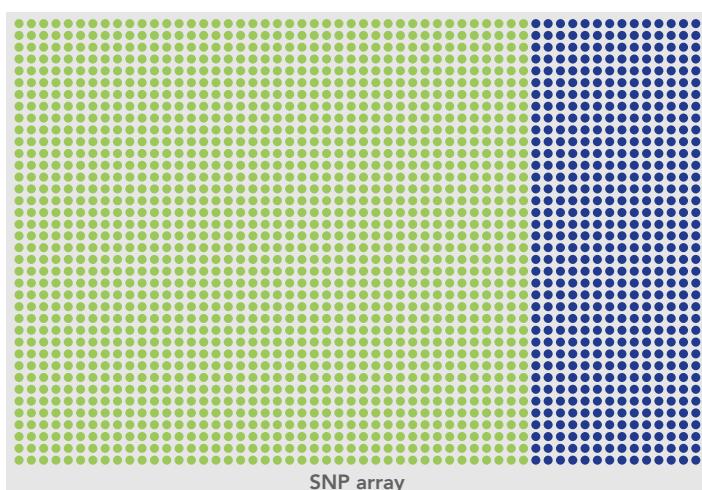
Bivalve aquaculture provides a valuable source of animal protein with a low environmental footprint, but climate change-related extreme events such as marine heatwaves (MHWs) have rapidly emerged as a major risk causing mass mortalities. In addition, climate change can enhance the spread and virulence of pathogens, also weakening clam immune defences. Under these changing environmental conditions, traditional management strategies are no longer sufficient to ensure production stability.

Selective breeding offers an effective long-term solution to improve resilience in farmed bivalves, enabling the development of stocks better adapted to heat stress and disease. To support this transition, IGNITION project has developed a robust, large-scale genotyping tool for two farmed clam species – Manila clam and native grooved carpet shell. This tool allows for an understanding of how traits are inherited as well as the implementation of modern, data-driven breeding programs.



~49,400 SNPs  
Manila clam

~14,200 SNPs  
Grooved carpet shell



● Manila clam

● Grooved carpet shell

This dual-species single nucleotide polymorphism (SNP) array is the first developed for both species and it is based on multiple European populations of both species. The platform comprises 63,585

markers: 49,392 designed for the Manila clam and 14,193 for the native grooved carpet shell. The array maximises applicability across European farming systems and is now commercially available.



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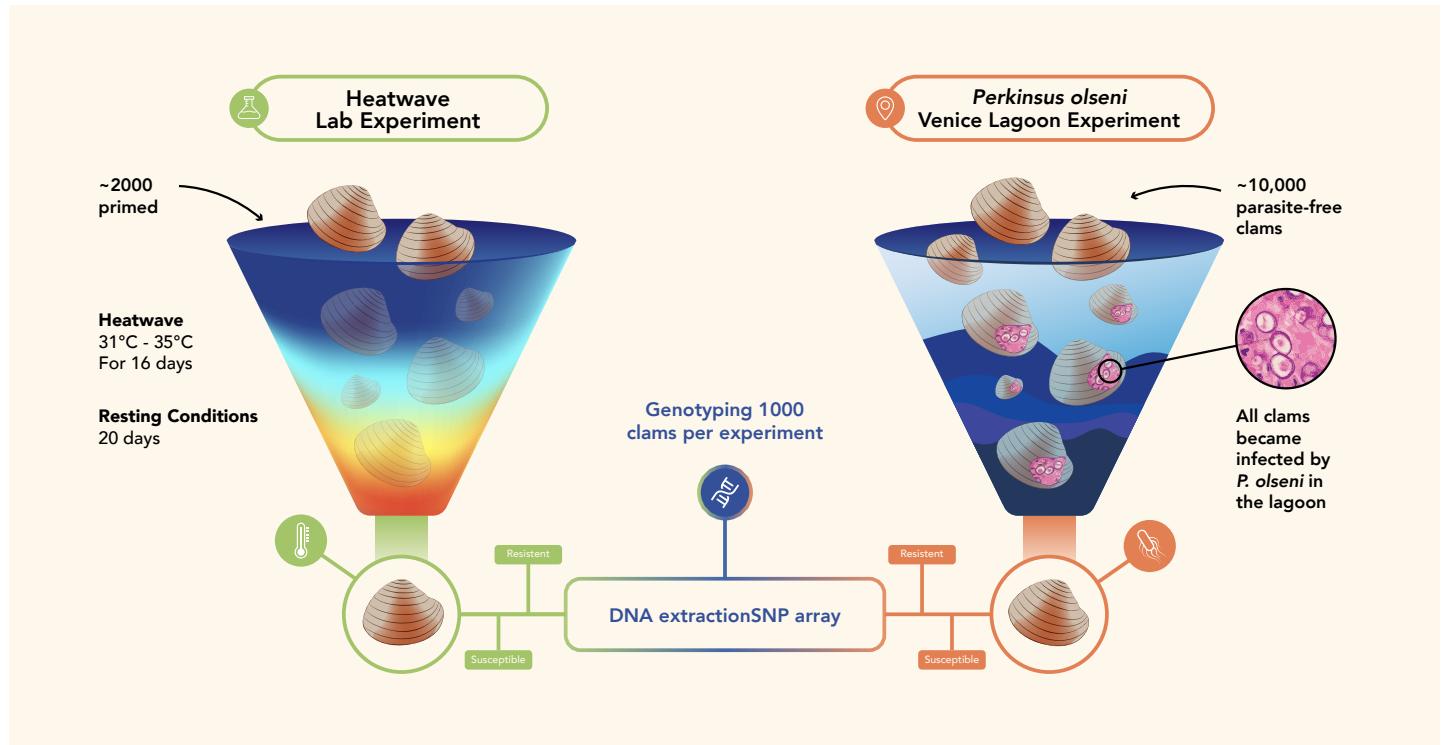
# Using the dual-species SNP array — from data to breeding opportunities

Two complementary experiments focused on the **key challenges affecting European Manila clam production**:

- (i) **MHWs** simulated under laboratory conditions, and
- (ii) **resistance to *Perkinsus olseni***, one of the most important pathogens for this species, assessed in an area naturally affected by the pathogen.

Clams were monitored for survival, infection status, and growth-related traits.

Subsequently, **more than 2000 clams were genotyped using the SNP array to estimate the heritability of resistance and commercially relevant traits to support informed selection decisions.**



Preliminary analyses indicate **moderate heritability for several traits of adaptive and commercial relevance, including growth performance and both disease and heat-stress resistance**. These results confirm the presence of exploitable genetic variation in European Manila clam populations and the **robust performance and practical utility of the SNP array as a genomic platform for clam aquaculture**.

Overall, the SNP platform enables the implementation of informed and structured selective breeding programs and long-term genetic improvement, providing the genomic foundation needed to move Manila clam farming towards more resilient, predictable, and sustainable production systems, fully aligned with the emerging hatchery-based supply chain in Europe.

## LEARN MORE

**Project website:** [www.ignition-project.eu](http://www.ignition-project.eu)  
**Zenodo community:** <https://zenodo.org/communities/ignition/>  
**LinkedIn:** <https://www.linkedin.com/in/ignition-eu/>

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