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Commentary

Manila Clam (*Ruditapes philippinarum*) Production: Aquaculture Practices and Sustainability Challenges

Susan Lamberth*

Department of Aquatic Biology, University of California, Davis, California, United States of America

DESCRIPTION

Manila clam (*Ruditapes philippinarum*) is a commercially significant bivalve species widely cultured for its fast growth rate, adaptability to various environments, and high market demand. Originating from the Indo-Pacific region, the Manila clam has become a primary species in global shellfish aquaculture. This article reviews the current state of Manila clam production, focusing on aquaculture methods, environmental considerations, and sustainability challenges. The aim is to highlight key factors influencing clam farming and the need for sustainable management to meet growing market demands while minimizing ecological impacts.

The Manila clam (*Ruditapes philippinarum*) is an economically valuable shellfish that has been widely introduced into temperate regions outside its native range in the Indo-Pacific. Its appeal stems from its rapid growth, high market value, and ease of cultivation in coastal areas, particularly in Europe, North America, and Asia. Although *Ruditapes philippinarum* is traditionally harvested from the wild, aquaculture has become the dominant method of production in recent decades due to its higher control over growth conditions and sustainability potential.

Aquaculture techniques

Manila clam farming typically occurs in intertidal and subtidal zones, where the species can naturally burrow into sandy or muddy substrates. These aquaculture systems allow for consistent yields, but their success heavily depends on environmental factors such as water quality, temperature, and sediment conditions. There are several aquaculture methods employed to optimize clam production:

Intertidal culture: This traditional method involves seeding clam spat onto prepared plots in intertidal zones, where they grow in the sediment. This approach is labor-intensive but cost-effective, particularly in regions with suitable tidal conditions.

Suspended culture: In areas with deeper waters, clams are cultured in suspended bags or mesh nets, keeping them off the seafloor. This method protects the clams from predators and reduces the risk of sediment-related diseases or mortality.

Recirculating Aquaculture Systems (RAS): In land-based operations, clams are cultivated in controlled systems with recirculating water. While this method ensures year-round production, it requires significant infrastructure and can be expensive to operate.

Environmental considerations

Water quality is an important determinant of Manila clam growth and survival. Optimal temperatures range from 15°C to 22°C, with a salinity of 25-35 ppt. Clams are filter feeders, and their ability to efficiently remove plankton from the water depends on good water clarity and oxygen levels. Elevated levels of pollution, including excess nutrients and contaminants, can lead to calm mortality or reduced meat quality. Sediment type is another critical factor in clam farming. Manila clams thrive in sandy or muddy substrates with low silt content, which allows them to burrow efficiently and filter feed. Poor sediment quality can lead to low survival rates and slow growth.

Sustainability challenges

Despite the economic importance of Manila clam production, several sustainability challenges need to be addressed:

Overharvesting: In some regions, wild populations have been overexploited, leading to the need for more stringent regulations and the implementation of restocking programs.

Environmental degradation: Large-scale clam farming can impact local ecosystems, causing habitat disturbance or altering the balance of species in coastal areas. Efforts to mitigate these impacts include implementing Integrated Multi-Trophic Aquaculture (IMTA) systems, where clams are farmed alongside other species like seaweed or fish.

Correspondence to: Susan Lamberth, Department of Aquatic Biology, University of California, Davis, California, United States of America, E-mail: lamberthsus@unic.us

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Climate change: Rising sea temperatures and ocean acidification present risks to clam health, particularly since clams are sensitive to changes in water chemistry. Adapting farming practices to account for climate variability is essential for ensuring the long-term sustainability of Manila clam aquaculture.

CONCLUSION

Manila clam production has become a key industry in coastal aquaculture, with its rapid growth and adaptability making it a favored species for shellfish farming. However, to ensure the sustainability of this industry, it is important to address challenges related to overharvesting, environmental degradation, and climate change. Continued research and the adoption of sustainable farming practices will be essential to balance economic growth with environmental stewardship, ensuring that *Ruditapes philippinarum* remains a viable and ecologically responsible food source for future generations.