

Country report from Italy

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General remarks on the Manila clam fishery

The asari clam was introduced in Italy in 1986 and became rapidly one of the most important economic activity within national aquaculture product. The introduction of the asari clam in Italy is a quite cited example of successful introduction of an exotic species, contrasting ecological theories. Main sites of production are the north eastern italian lagoons of Marano-Grado, Venice and those within the Po River Delta (Fig. 1). Since its introduction, the production peaked exponentially, reaching in 1999 some 65,000 tons; at present the national production is nearly 35,000 tons in 2013 (Fig. 2). The main reason for such decrease is the much lower contribution of the Venice lagoon to the total, as a consequence of multiple factors (oligotrophication of the lagoon, anoxia, parasites, bad management of the resource). Elsewhere (Goro Lagoon, the study case presented) the production remained stable or even tended to increase due to appropriate management practices, targeting the tidal canals, the substratum and the creation of a nursery area.

Basic information on fishery

Geography and geomorphological characteristics: Asari clam fishing is mainly operated in sandy microtidal flats and shallow sub-tidal waters in semi-enclosed lagoons.

Fishing method: Short shaft raking, long shaft raking, clam dredge, hydraulic dredge (the latter most used at present).

Fishery management: Shell size regulations, fishing closed season, joint selling via cooperatives.

Standing stock assessment: Statistical survey by fisherman's associations.

Others: Special attention on natural nursery areas outside lagoons protected by events as anoxia or macroalgal blooms.

Basic information on aquaculture

Environmental characteristics: Aquaculture of the asari clam is mostly done on fishing grounds in microtidal flats (sandy and muddy sandy substrate) in Italy.

Culture methods: Bottom culture by reseeding using transplanted natural spats.

Operational management: Frequent cleaning of farming areas and removal of opportunistic macroalgae.

Others: Special attention to sustainable farming densities (max 500 ind/m²) in order to avoid oxygen depletion and sulfide production, as well as algal blooms (mathematical models specifically developed).

Major constraints and countermeasures

Habitat degradation: This is a consequence of harvesting techniques (destruction of natural sediment gradients, re-suspension of nutrients, drastic drop of oxygen due to chemical oxidation of reduced compounds), increase of sedimentary oxygen demand, large macroalgal blooms. Frequent movements of sands from marine to brackish areas, frequent dredging of tidal canals to improve water circulation, frequent harvesting of macroalgae.

Overfishing: This has happened in the Venice lagoon and in part in the Goro Lagoon. In the latter fishermen associations decided to invest in nursery areas in the open sea where clams are not collected and constitute a "buffer" for period of crisis, providing seeds.

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Diseases and parasites: Not relevant for the stocks

Climate change: There are not demonstrated effects up to now. Changing river flow may affect freshwater transport and lagoon salinities with some impacts. However, these are not relevant at the moment.

Economic aspects: Wide variations of prices due to unregulated market (very beginning). At present the prices are relatively low (2 - 4 euros per kg) but

stable.

Others: Predation by crabs if seeded clams are too small.

Proposed international collaborative studies in the future: Very welcome. The Sacca di Goro Lagoon has been a key study site in different National and European projects targeting impacts (anoxia, macroalgae) and sustainability (economic and environmental).



Fig. 1. Main sites of farming of *Ruditapes philippinarum* in northeastern part Italy.

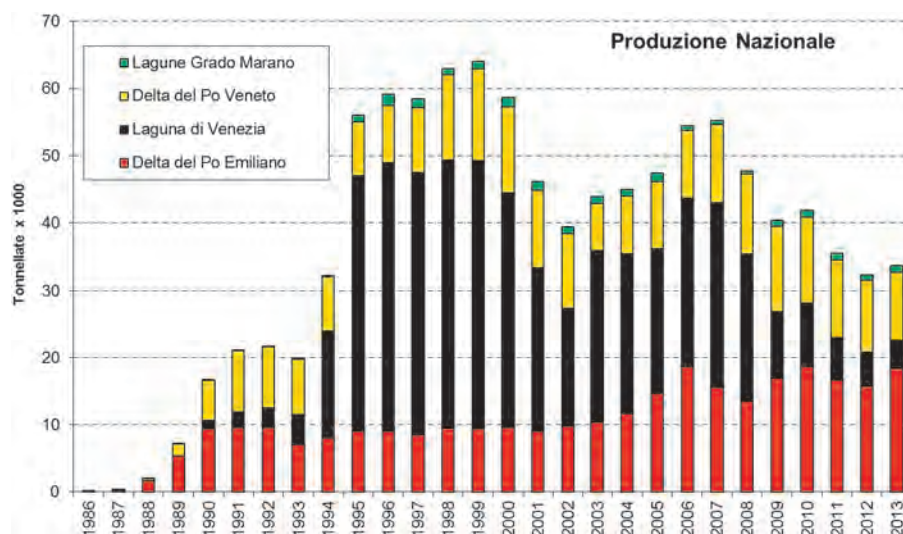


Fig. 2. Annual production (1986 - 2013) of *Ruditapes philippinarum* in the main production sites in Italy. The crisis of the production in the Venice lagoon is evident (black bar).