

# Tropical Lobster Ranching

## Bridging the gap between fisheries and aquaculture



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### ABSTRACT

Tropical lobster (TL) is considered to be of high value in the gulf countries, as well as in China and South East Asia, fetching up to US\$100/kg. Whilst, the fisheries of lobsters in the Arabian sea and the Persian Gulf is important and supports tens of thousands of fishermen, it is relatively limited in volume and value. In 2016, Oman produced 485 tonnes of lobsters, worth about 2.3 million riyals, according to the Ministry of Agriculture and Fisheries statistics. Only around 20% of the catch is exported to neighbouring countries.



Adult (market size) lobster in holding tank

The aquaculture of TL is limited due to a lack of seed supply (currently, there is no commercial supply of TL puerulus anywhere in the world).

Over the past several years, ranching of TL puerulus in Vietnam has become a booming business, with production of 1,500 tonnes/year.

Collection of puerulus in these countries is achieved by several methods including seine nets and light during the night, smaller nets, collectors and shelter traps of various materials. The catch range is between 2-4 millions/year. There is a very high mortality during the

collection and transporting stages due to poor handling, holding and transport.

Nursery phase is done in shallow submerged cages from floating frames. Juvenile weight 30-50 gr are then grown to 1 kg (*P. ornatus*) or 500 gr – 1 kg (*P. homarus*). The lobsters are fed trash fish and survival varies significantly between 30% and 70%.

One of the main issues in the growout stage is the nutrition and feeding of the lobsters with trash fish, resulting in high mortality due to bacteria load and disease outbreaks.

### INTRODUCTION

Tropical lobster (TL) is considered to have a high value in China and South-East Asia, fetching up to US\$100/kg (usually sold live). Farming of lobsters has long been sought to meet the increasing demand for these premium crustaceans. Lobster fisheries throughout the world have static or decreasing production due to poor management or other factors including climate change, habitat etc. Closing the life cycle of lobsters and large-scale production of juveniles in a continuous and sustainable way is not yet achievable due to biological impediments such as prolonged larvae stages and the delicate nature of the larvae. Currently, there is no commercial supply of tropical lobster puerulus anywhere in the world. Thus, the interest in lobster 'ranching' - the capture of naturally settling baby lobsters (lobster seed or pueruli) and/or juveniles, and rearing to marketable size. Currently, this form of lobster aquaculture is the only one with commercial success in several countries.

Over the past decade, ranching of tropical lobster puerulus has been developed in several countries in Asia including Vietnam, Indonesia, Philippines, Malaysia. Interest in developing lobster ranching is also increasing in China, Thailand and India.

Vietnam has, by far, the most developed industry with production of 1,500 tonnes/year.

Primarily, there are two main tropical species which are collected in South East Asia, *Panulirus ornatus* and *P. homarus*. Ratio between these species vary between regions. In Vietnam, the ratio is



Juvenile lobster

75% *P. ornatus* to 25% *P. homarus* whilst in Indonesia the majority of the collection is *P. homarus*. Live, market-size tropical lobster can fetch up to US\$100/kg (farm-gate) and it is mainly export to China.

### COLLECTION

Collection of puerulus is achieved by several methods including seine nets and light during the night, smaller nets, collectors and shelter traps of various materials. The catch range is between 2-4 millions/year and 0.6-5 millions/year in Vietnam and Indonesia\* (\*numbers Correct to 2015), respectively. Most of the puerulus are caught in protected areas (bays etc.). Very high mortality occurs during the collection stage due to poor handling, holding and transport.



Lobster fishing boat (light setup and nets for night collection) photo - C Jones

### NURSERY

The nursery phase is done in shallow submerged cages from floating frames. Puerulus are grown to an average weight of 30-50 gr and are fed chopped trash fish. Survival varies between 30-70%. Once reaching the desired weight, the juvenile lobsters are transferred to growout cages which are bigger and usually in deeper water. The lobsters are fed trash fish and survival varies significantly between 5% and 70%. The growth period averages 20 months from 50 gr to

1 kg. *P. ornatus* is grown to 1 kg while *P. homarus* grown to 500 gr. Once reaching market size the lobsters are shipped live to China.

## INDUSTRY SECTOR

In Vietnam, the industry of 'ranching' or 'fattening' of lobsters is divided to several sectors:

1. Puerulus 'seed' fishery. The collection of puerulus is done by fisherman from villages near the sites where puerulus are concentrated.

2. Seed dealers/middlemen are then buying the 'seed' from the fisherman and are in-charge on the transportation to the nursery sites. In some cases, dealers also have holding facilities for the seeds. In recent years, importation (mostly illegal) of seeds from Indonesia has increased dramatically to supply the increased demand.

3. Nursery farming. Small cages near shore. The operators buy the seeds from the middlemen.

4. Growout farming. Farmers either buy the juveniles from nurseries or have their own nursery cages before transferring the juveniles to grow out cages.

5. Associated feed supply (mainly other fishermen who supply trash fish), equipment, wholesale buyers and exporters



Lobster growout cages

## ISSUES AND PROBLEMS

- Disease ('milky' disease, rotten tail and others). Due to husbandry practices of trash fish feeding, relatively shallow water, accumulation of organic matter under the cages, health management and other factors, mortality is significantly varied. In Vietnam survival was reported as high as 70% while in Indonesia (2013) it was low at 30%. For every puerulus captured in Vietnam, \$65 is returned, while in Indonesia it is <\$3.

- Mortality of wild caught puerulus (30 to 50%). Basic methods for packaging, holding and transporting puerulus after

collection are the cause of high mortality.

- Trash fish feeding issues. One of the main issues in the nursery and growout stage is the nutrition and feeding of lobsters with trash fish which results in high mortality due to bacteria load and diseases outbreaks.



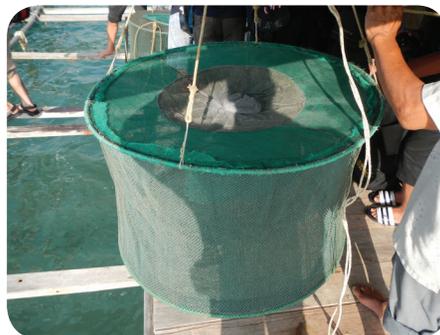
Lobster holding tank

## Arabian sea

Aside from Oman, there is limited information on lobster fisheries in the Persian Gulf and the Arabian sea. In Oman, the main species is *P. homarus*. It considered to be an important fishery, although limited in volume and value. In 2016, Oman produced 485 tonnes of lobsters, worth about 2.3 million riyals (~US\$ 6million), according to the Ministry of Agriculture and Fisheries statistics. Only ~20% of the catch is exported to neighbouring countries. Lobsters are sold fresh (dead) in local markets and fetch 3.5-5 riyals (US\$ 9-13)/kg. Fishing season is short (two months) and berried female and juveniles smaller than 8 cm must return to sea. There are no holding facilities for live lobsters.

## FUTURE DIRECTIONS

The high demand and prices in China for live lobsters may present an opportunity for the Gulf countries. Comparing the local market price of US\$ 9-13/kg with US\$ 75-100/kg in China may be an incentive for the development of ranching and live export of lobsters with high return on investment (ROI).



Lobster nursery cage photo - C Jones

It is not known if puerulus can be collected in commercial quantities in the Arabian sea and if, at all, this collection is sustainable. Thus, there is a need for lobster puerulus survey to identify these points.

However, since the minimum legal size of lobster is 8 cm, it might be possible to enhance the current fishery by 'ranching' or fattening these small lobsters.

It is suggested to develop an aquaculture project involving collection of lobster puerulus and/or legal-size juveniles and culture ('ranching') them to market size using either on-shore tanks and/or near-shore cage systems. These projects should focus on advanced collection (either puerulus or juvenile lobster), handling, transporting and grow-out methods to ensure high survival and sustainability. Optimal nutrition and best feeding practices of available feeds (formulated feeds and/or boosters, on-farm made diets etc.).



Peurulus tropical lobster (size of lobster which is collected in Vietnam and Indonesia) photo - C Jones

Aside from ranching lobster juveniles, attention should be geared towards the possibility of keeping some of the lobsters live and developing the live export of lobsters to China. This will require adaptation of the fishing boats (including training fishermen), establishing holding facilities and live export logistics. A good example of live lobster fishing, holding and exporting is Western Australia which export 95% of its lobster catch (5,500 tonnes) live to China.

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