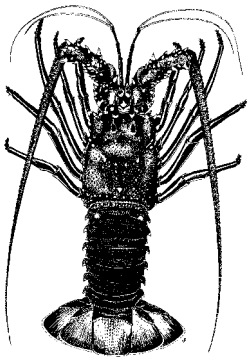
Rock lobster



Name of species/group

Spiny rock lobster (*Panulirus* spp.). The dominant and most widespread species in the Pacific is the pronghorn or golden rock lobster, *P. penicillatus*. Other common species are the painted lobster, *P. versicolor*, the striped leg lobster, *P. longipes femoristriga*, and the ornate lobster, *P. ornatus*. All are large (total length more than 25 cm as adults, up to 50 cm for *P. ornatus*) and actively fished for by hand or spear.

Primary potential

The primary potential is for aquaculture for cash income.

Attributes for aquaculture/stock enhancement

- High value species with excellent local and potential export markets.
- Juveniles easily captured but may be of limited availability.
- Lobsters are robust and easily cultured from juveniles to market size (800 g or more) within 18 months on natural or pelleted feeds.
- Capital investment for on-growing of the lobsters need not be high. Ideal for subsistence farming or scaling-up to more intensive forms of production.

Culture methods

- Hatchery production of spiny lobster seed is not yet developed. Even if successful, seed production will be very difficult technically, and prolonged (4 months or more), making it high risk.
- Seed lobsters recruiting into shallow near-shore reefs and structures are easily caught using fixed crest nets or trolled lampara nets, or by collecting aggregations of lobsters by hand from natural or man-placed collection sites.
- The abundance of recruiting seed in Pacific Islands countries is not well documented but is likely to be comparatively low.
- Captured lobster seed of more than 25 mm total length (TL) is easily on-grown. However, overcrowding and poor handling of the seed, and particularly of non-pigmented post-pueruli, can result in high mortality (more than 30%) in the immediate post-capture period.
- In Vietnam, where culture production of *P. ornatus* amounts to 1000 tonnes annually, lobsters are cultured in floating or fixed net sea cages in protected bays or lagoons that have a good tidal flow. Seed lobsters of about 25–30 mm TL are stocked (100 to 200 per cage) in small floating net cages (typically about 2 m square and about 2–2.5 m deep; 2.5 mm square aperture) and grown to a size of about 50 g (10–12 cm TL). At this size, lobsters are placed (100 per tank) into larger grow-out cages, typically about 4 X 4 m or 4 X 6 m and 5 m deep (at high tide), with net aperture of 10–15 mm square. Small lobsters are fed a mixture of shellfish (oysters, crabs) and fish, with more fish and less shellfish given as the lobsters grow. Lobsters are sorted into same-sex groups after reaching

300–400 g: males grow faster than females. Lobsters attain a typical harvest weight of 1 kg within 18 months from initial stocking. Survival of lobsters from stocking into grow-out cages is typically 90%. Surprisingly, no hides or shelters are provided for the lobsters in the Vietnamese cages but sand is frequently added to provide a bottom substrate. A serious disease problem of caged lobsters occurred in Vietnam in August 2001 with losses as high as 20–30% of the cage in one week. The disease was attributed to pollution and poor water quality predisposing the lobsters to fusarium and/or vibrio infections.

- Research in Australia is examining on-land and in-sea culture systems, and pelleted dry lobster diets are under development as an environmentally more sustainable alternative to fresh foods.
- Lobsters in Vietnam are sent live to Tokyo and Hong Kong markets, where they fetch prices of USD21–28/kg depending on size. Even though the demand for seed is high and prices are accordingly high (USD5–10 per piece, depending on size) lobster culture is very profitable, with operating profit in the order of 100%.

Current production status

- On-growing of wild-caught seed lobsters is widely practised in Vietnam, the Philippines, India and Indonesia. Farming is typically on a subsistence scale (limited by the availability of seed) although the magnitude of production in Vietnam is collectively very large (1000 tonnes annually).
- In Australia and New Zealand, lobster seed cannot be taken for aquaculture except under strict and limited pilot licence conditions. However, there is some in-sea and on-land holding of legal-size lobsters for weight gain and/or more favourable (niche) marketing.
- There is considerable research investment in Australia and New Zealand to develop hatchery propagation and optimal grow-out culture and feed technology for spiny lobster aquaculture.

Marketing

- All marine lobsters are highly regarded by people of all cultures as fine table food and thus are in high demand.
- Most wild lobster fisheries are overexploited, with many stocks having already collapsed or catch rates closely regulated to sustain the wild fishery.
- For these reasons, lobsters fetch high prices. The highest price is paid for live product, chilled or frozen products bring much lower prices (at least by half).
- Aquaculture offers the only prospects by which lobster supplies can realistically, and sustainably, be increased.
- Major market for Pacific Islands countries would be local, supplying hotels and restaurants. It appears that the wild lobster catch (about 300 tonnes/year collectively for Pacific Islands countries) is unable to satisfy local demand.

- Considerable export potential exists for live product to Southeast Asian markets. This would require lobsters to be cultured close to major centres that have international air services.
- Packing and transport conditions for live shipment of lobsters are well developed and would not be a problem.
- Development of a successful export market would require both continuity of supply and a reasonable volume of production.
- There is very little known about the lobster stocks of Pacific Islands countries and whether aquaculture production would be sustainable if recruiting seed was taken in large quantities for aquaculture.

Comparative advantages/disadvantages (risks) of producing the species in the Pacific

- Aquaculture offers the only real prospects by which lobster supplies can be sustainably increased.
- In the short term, and until successful and economically viable propagation of spiny lobsters is achieved, aquaculture will depend on the availability and sustainability of captured wild seed.
- The faster growth rate of tropical *Panulirus* spiny lobsters compared to the cold water *Jasus* species is a strong competitive advantage for lobster aquaculture for Pacific Islands countries. Although hatchery propagation of spiny lobsters is still far from becoming a commercial reality, the more rapid larval development of tropical species is a distinct biological advantage over that of the temperate species.
- Since the rate of recruitment of seed to the adult wild fishery is low, with perhaps only 5% (and probably less) ever attaining adulthood, the capture of a modest proportion of wild seed for aquaculture on-growing (e.g. 0.5 million pieces from a total recruitment likely to be in excess of 10 million annually) would enable an aquaculture industry of 300 tonnes per annum without detriment to the sustainability of the wild fishery in Pacific Islands countries.
- However, before contemplating aquaculture on this scale, research is warranted to better determine the stock structures of spiny lobsters in the Pacific region and to estimate recruitment patterns and survival rates. Such research would enable responsible fishery management polices to be put in place (e.g. quotas on captured seed and collection sites, restocking of a proportion of the on-grown catch) to ensure sustainability of the wild fishery stocks.
- Similarly, appropriate controls to regulate the number of cages and culture sites may be necessary to minimise environmental impacts to the adjacent reefs and waterways.
- By way of a cautionary note, attempts in the late 1970s and again in early 1990s to establish large-scale intensive aquaculture of spiny lobsters in the Philippines collapsed within a few years of establishment when seed supplies became insufficient to support the venture.
- Low intensity aquaculture of spiny lobsters for the ornamental or food markets could be a very profitable domestic and/or export industry in some parts of the Pacific. However, the Philippines experience of going too intensive too quickly should not be forgotten.