

Name of species/group

Several species of marine prawn are commercially farmed in various parts of the world. The most important of these are giant tiger prawn (*Penaeus monodon*), western white prawn (*Litopenaeus vannamei*), western blue prawn (*Litopenaeus stylirostris*), Chinese white prawn (*Fenneropenaeus chinensis*), Indian white prawn (*Fenneropenaeus indicus*) and Japanese kuruma prawn (*Marsupenaeus japonicus*). Two species, *P. monodon* and *L. stylirostris*, have been found suitable for aquaculture in the Pacific.

Primary potential

As it is still at a preliminary stage of development in Pacific Islands countries, marine prawn is recommended for aquaculture only. Stock enhancement is too costly and a lot of effort is demanded due to poor survival after release into the wild. The nursery habitat for penaeid prawn species is brackish water and estuaries, and the absence of this environment in many Pacific Islands countries suggests that the potential for stock enhancement is likely to be limited.

Attributes for aquaculture/stock enhancement

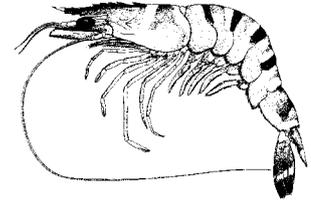
Penaeus monodon

- ▶ Giant tiger prawn can be grown to a large size (40–60 g) to fetch a higher price in international markets (price is often size-related).
- ▶ Culture and hatchery techniques are not as simple as for *L. stylirostris* (below).
- ▶ Suitable for aquaculture only in countries such as Fiji Islands, Solomon Islands and Papua New Guinea where it is native. Other countries may face problems of chronic shortages of wild broodstock and high risk of importing virus-infected animals or non-reliable broodstock (due to its difficulty in domestication).
- ▶ Captive breeding is difficult and hatchery survival is low (20–30%).
- ▶ Farms should be located in brackish water areas or coastlines with available freshwater supply throughout the year. These conditions are not commonly found in the region.
- ▶ This species is only suited to intensive culture, which requires high investment and intensive care.

Litopenaeus stylirostris

- ▶ *L. stylirostris* is nearly identical to *L. vannamei* in origin, appearance, biology, culture and hatchery techniques; the techniques for both species are less sophisticated and require less intensive care than for *P. monodon*.
- ▶ *L. stylirostris* is able to breed in captivity with high survival in hatchery conditions (50–60%).

Penaeid prawn



- ▶ Although it is an exotic species for Pacific Islands countries, it is easy to maintain captive broodstock in ponds or tanks for long periods. Development of pathogen-free and pathogen-resistant strains is also possible. Therefore this species is more suitable for countries which have to rely on import of broodstock.
- ▶ Growth rate is uniform and fast in the early stages but slows down after 3–4 months (18–20 g).
- ▶ As it can tolerate higher salinities than *P. monodon* or *L. vannamei*, closed-system culture using full strength seawater is possible; this would have the added advantage of assisting in the control and prevention of viral diseases.
- ▶ An advantage of this species is that it may be cultured in various ways and at a range of costs, from low cost extensive culture to medium cost semi-intensive culture to high cost intensive culture.

Culture methods

- ▶ Culture techniques for both species are similar.
- ▶ In order to avoid shortages and delays in supply, postlarvae (PL) should be produced from local hatcheries, which may be either low investment outdoor or high investment indoor facilities.
- ▶ If they are not available in the wild, disease-free broodstock may be imported, but this should occur only if strict quarantine procedures are followed.
- ▶ In the initial stages of penaeid aquaculture development, low maintenance semi-intensive culture (5–10 PL per square metre) in large ponds (5–10 ha) should be adopted. This will allow acquisition of local skills in penaeid aquaculture and the training of local staff.
- ▶ At these moderate densities the amount of feed required will not be high; this will be an advantage in areas where feed is not produced locally.
- ▶ Production is also moderate: 600–1000 kg/ha.
- ▶ In sustained production, as a precaution in case of virus disease outbreak the trend of farm design is toward smaller (0.5–2.0 ha), more intensive farms (30–50 PL per square metre with production of 1,200–5,000 kg/ha), using a closed system or water recycling system if possible.
- ▶ Infrastructure and equipment should be improved for hygienic purpose.
- ▶ In Asia, in every country the pilot farms have been large scale with high investment, covering hatchery, processing plant and export enterprise. This makes it feasible to import and adapt technologies to suit local conditions, as well as to train local staff. Later, small-scale farms run by trained personnel will follow if government and banks can provide them necessary infrastructure and source of funds.

Current production status

- ▶ Due to its high profitability, penaeid shrimp farming has been the focus of commercial development in several Pacific Islands countries over the past 30 years, with varying degrees of success.
- ▶ Development has been slow due to the lack of suitable technologies, traditional skill in aquaculture, capital, infrastructure and R&D support from governments.
- ▶ In 1999, 39 and 13 tonnes of *Penaeus monodon* were produced for the export market in Fiji Islands and Solomon Islands respectively. Currently, there are three grow-out farms and hatcheries in Fiji while two farms in Solomon Islands still rely on seeds imported from Australia.
- ▶ In 1999, 1,906, 43 and 25 US tons of *Litopenaeus stylirostris* were commercially farmed in New Caledonia, French Polynesia and Guam, respectively. These large enterprises mainly applied technology developed in France and Tahiti. Penaeid farming technology is sufficiently well developed that Pacific Islands countries can adopt from other countries the most appropriate technologies for the region.

Marketing

- ▶ To avoid high competition from the major prawn producing countries where production and shipping costs are less, Pacific Islands countries should focus on producing high value eco-labelled, clean and green products.
- ▶ *L. stylirostris* is tolerant of high salinities, and is therefore suitable for eco-labelling because its farm sites can be located outside mangrove areas, where the farm effluent discharges will produce lower organic loads because of the stronger flushing effects in more exposed open waters.
- ▶ The freshness of green products could be promoted locally for the tourist market.
- ▶ A market for live prawn in domestic Chinese restaurants can double the price, and this should be developed where possible.

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

Advantages

Penaeus monodon

- ▶ Rapid growth to a large size.

L. stylirostris

- ▶ Can tolerate high salinities, and therefore does not require brackish conditions, which are scarce or absent in many Pacific Islands countries.
- ▶ Culturing in seawater may avoid some of the problems with viral infection that occur in brackish water culture.

- ▶ Can be grown at a range of costs and intensities (low to high) to suit the local technical expertise and financial resources.

Disadvantages

Penaeus monodon

- ▶ Supply limitations in areas outside its native range.
- ▶ Difficult to breed and maintain in hatchery conditions.
- ▶ Requires brackish conditions, which are limited in availability, or absent, in many Pacific Islands countries.
- ▶ Best suited to intensive culture, which requires high investment and care, and which may cause eutrophication problems in the oligotrophic conditions of the coral reef habitats of many Pacific Islands countries.

L. stylirostris

- ▶ None identified.