**Name of species/group**
Pearl oysters (Pteriidae).

**Primary potential**
Aquaculture.

**Attributes for aquaculture/stock enhancement**
- Culture techniques well established and relatively simple.
- No feed input (nursery and grow-out) so reduced environmental impact.
- Possible to collect culture stock (adults and juveniles) from the wild.
- Well established markets.
- Range of products (shell, half and round pearls, meat).
- High value product.
- Ease of product storage and transport.

**Culture methods**

**Juveniles/seed**
- **Wild:**
  - Spat (seed) can be collected from the wild using spat collectors.
  - Spat collectors can be made from a variety of materials (e.g. shade cloth, tree branches, onion bags).
  - Spat collectors are immersed to coincide with major recruitment periods.
  - Spat are removed from collectors at a time to maximise size but minimise predation.
  - Spat collection uses simple low cost technology, is easy to manage and is suitable as a small-scale operation.
  - Income could be generated by selling spat to pearl farms.
  - Spat collection has low environmental impact and is suitable for women.
  - The major disadvantage is reliance on natural recruitment which can be unreliable.

- **Hatchery:**
  - Reproductively mature broodstock can be obtained from wild or culture stock.
  - Broodstock are induced to spawn using thermal stimulation. Eggs and spawn need to be combined for fertilisation within 60 minutes of spawning. Fertilised eggs are incubated, 30–50 per ml, in lightly aerated 1 micron filtered seawater for 24 hours. Incubation tanks are drained and larvae are retained on sieve mesh.
• Larvae are stocked at a density of 1–2 per ml into culture tanks containing well aerated 1 micron filtered seawater.

• Larvae are fed cultured microalgae at a density of 1000–20,000 cells per ml, depending on age. Amount of algae is increased with increasing larval size.

• Water in larval culture tanks is changed (fully or partially) every 2 days.

• Larvae large enough to be retained on a 170 micron screen are removed to settlement tanks containing spat collectors. Larvae are recruited to collectors and retained in settlement tanks for a further 2 weeks.

• Settlement tanks receive daily feeding and daily partial water change.

• Spat collectors are removed to the ocean where they are left until the juveniles are large enough for removal (around 3 months of age).

• Hatchery culture is costly, technically demanding and unsuitable for small-scale operations.

• Advantages include year-round production, independence from natural recruitment events and genetic manipulation. The latter may be important for developing oysters to produce larger pearls or pearls with ‘niche’ colours.

Grow-out

► Pearl oysters are cultured using simple low cost technology, which is suitable for small-scale operations and village based production.

► Major management issues are regular checks for predators, cleaning of bio-fouling, and upgrading of net size as oysters grow.

► The simplicity of pearl oyster grow-out results primarily from the fact that oysters feed on natural plankton so feed input is not required.

► Lack of feed input considerably minimises environmental impacts relative to other aquaculture species. However, large areas dedicated to pearl oyster culture do represent some navigational hazard.

► Considerable potential for employing women directly in pearl oyster culture and in value-adding activities.

Current production status

► Commercial production in French Polynesia, Cook Islands. French Polynesia is currently producing 11 tonnes valued at USD165 million.

► Small-scale production in Solomon Islands, Fiji Islands, Marshall Islands, Tonga, Federated States of Micronesia. Research in Kiribati, Tonga (half pearls or mabe).

► Production problems include disease (through poor husbandry), predation (primarily by Cymatium spp. gastropods) and lack of trained personnel and technical expertise.
Marketing

- There is considerable international potential, and domestic potential for countries with significant tourist industries.
- Pearls are an ideal export commodity, being small and lightweight yet of high value with no specific storage or transport requirements.
- Large increase in production of black pearls in French Polynesia has seen their value decrease from an average of USD77 per gram in 1986 to around USD13 per gram in 2000.
- Quality control efforts in French Polynesia are likely to help stabilise the price and the market for cultured black pearls.
- There is clear opportunity for niche markets for unusually coloured pearls. Given current competition, new entrants to the pearl market will need to maintain a high quality product.
- There appears to be potential for mabe pearl (from Pteria sp.) production in the Pacific.

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

Advantages

- Limited resources required for pearl oyster culture.
- No food input required, minimising environmental impacts and costs.
- Well established markets and culture protocols.

Disadvantages

- Reliance on specialised technicians for pearl seeding.
- Overproduction or increased production may depress product value and impact potential market and profits.
- Lack of appropriate technical expertise in many Pacific nations.