Queensland Government

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Black tiger prawn aquaculture

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The black tiger prawn (*Penaeus monodon*) is a fast-growing tropical to subtropical species suited to warm, brackish waters. The black tiger prawn is one of 3 prawn species farmed in Queensland, and the main species farmed in Australia.

Purpose-built earthen ponds, constructed on coastal lands or adjacent to the estuarine parts of river systems, are used for the intensive culture of marine prawns.

Successful prawn farming requires a sustainable and clean coastal resource. The industry is currently regulated by local, state and, in some areas, commonwealth laws to ensure a high standard of protection for the environment.

Prawns are harvested early in the year (up to May), and also on demand. Most of the black tiger prawn crop is sold on the domestic market.

This guide provides an overview of black tiger prawn aquaculture in Queensland.

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Culture environment for black tiger prawns

Water salinity

Black tiger prawns can grow quickly under a wide range of salinities. Maximum growth rates occur in 15-20 parts per thousand (ppt) salinity - seawater is normally 35ppt. Prawns can survive in zero salinity (freshwater) for short periods.

Water temperature

Because black tiger prawns are a tropical species, their best growth rates occur when water temperatures are 25-30^{o}C. Feeding stops at around 20^{o}C and death will occur around 14-15^{o}C.

This temperature range limits production to one crop during summer in areas south of Mackay and two crops between Cardwell and Cooktown, provided good management, controlled stocking rates and selective harvesting are in place.

Stocking density

Ponds are stocked with post-larvae at rates varying from 25-40 per square metre. The higher the stocking densities, the slower the growth rates. With water temperatures above 24^{o}C prawns should reach 30-35g each in 120-150 days.

Pond size

Prawns are normally grown in purpose-built earthen ponds next to the estuarine parts of river systems. Most ponds are about 1ha in size and have a gently sloping bottom to allow for drain harvesting of the prawns and full draining for a dry-out period between crops. Pond depths vary from 1.5-2.0m.

Related links

- Find out how to get started in aquaculture.
- You will need to discuss technical and licensing aspects of any proposed aquaculture venture with staff from Fisheries Queensland and the Department of Environment and Heritage Protection before proceeding with site selection, design and, where applicable, land purchase.
- The Australian Prawn Farmers Association is a key contact for new farmers, investors and businesses looking to get involved in Queensland prawn farming.
- Find out how to prevent, identify and manage disease in aquaculture farms.
- Download the Australian prawn farming manual for more information about prawn farming.
- Download the latest report to farmers for aquaculture industry statistics and production data.

Tiger prawn breeding and post-larvae production

Prawn larvae are produced in hatcheries, which use wild-caught spawners or broodstock collected mainly from the coastal waters between Cooktown and Innisfail.

The majority of these spawners are gonadally mature and when they are transferred to the hatchery they either spawn spontaneously or are induced through the use of eyestalk ablation.

Each spawner will produce between 200,000 and 500,000 eggs. The eggs are hatched and pass through a number of larval stages until they reach the post-larvae stage. The post-larvae are normally sold to the growout farms for stocking ponds when they are 15-20 days old. The quality of the post-larvae will vary between spawners and the time of the year the spawners are collected.

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Growing and harvesting black tiger prawns

Growout

Pond preparation

Between harvests, stocking ponds are dried out and accumulated sediments from the previous crop are removed. These sediments contain organic matter (dead plankton, faeces, uneaten food and old moults) and mineral matter (soil particles eroded from pond walls by aeration). Prior to filling, the ponds are limed to encourage plankton growth and minimise disease problems. The ponds are filled through screened inlets, fertilised with both organic and inorganic fertilisers and allowed to stand for 7-10 days to allow the plankton to develop.

Feeding

Ponds are stocked with post-larvae at rates varying from 25-40 per square metre. The post-larvae are weaned from plankton to manufactured feed over the first 4 weeks.

Prawns are fed 3-4 times per day, with the last feed being given close to dark. Feed is blown into the pond using an engine-driven blower. Consumption is measured at each feed by using feed trays that are submerged along the pond edges. Growth rates are monitored via weekly sampling of the prawns. This feed management enables farms to minimise feed wastage and maintain good feed conversion rates.

Feed conversion ratios (kilogram of feed to produce 1kg of prawns) range from 1.6:1 to 2.2:1.

Water quality

Stable pond conditions and good water quality are necessary to maximise survival and growth rates. Paddlewheels and aspirators are normally used for aeration. The aeration generates a current causing the sediments to accumulate in the centre of the pond. This maintains a clean feeding area around the pond edge. As the quantity of prawns (biomass) increases, the level of aeration required increases to maintain the levels of dissolved oxygen in the water. A minimum of 1 kilowatt of aeration is required for each tonne of prawns in the pond.

Exchanging water controls the density of algal blooms and ammonia levels in the ponds. Water exchange is minimised to help maintain stable water conditions.

Wastewater is removed from the bottom of the pond and drained into sedimentation or treatment ponds before being reused or released to the environment.

Harvesting

Crops are normally ready for harvest in 120-150 days; however, the time will depend on stocking rates and water temperature.

Ponds are sometimes partially harvested using traps or seine nets, but more often a drain harvest is used. The water is released through the outlet structure, which has a net fitted over the pipe and the prawns are then caught in this net. Partial harvests may be used early in the season to reduce the density of prawns in the pond and allow the prawns remaining to grow to a larger size.

Normally, prawns are harvested when they are 25-35g each. Prawns are washed, graded and generally cooked before marketing. Some prawns are sold green and others are individually quick-frozen for storage and sale at a later date.

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