

An Introduction to the Australian Redclaw Industry.

Redclaw Industry Development History

Over one hundred species of freshwater crayfish live in Australian rivers, lakes and swamps. But of all these endemic crays, intensive culture has only been attempted with three *Cherax* species. Prior to the development of crayfish farms, Marron (*Cherax tenuimanus*), Redclaw (*Cherax quadricarinatus*) and yabby (*Cherax destructor*) had been harvested from the wild for many years as part of recreational fisheries. Fledging yabby and marron farming industries had been operating in the southern states for some time before the farming Redclaw was started. At this point in time Redclaw farming is mainly confined to Queensland.

The Queensland crayfish farming pioneers tried to emulate the Western Australian marron industry by establishing some farms in South East Queensland in the early 1980's. A number farms were set up stocked with marron, but all the marron died in a particularly hot summer in 1986/7.

A couple of visionaries had already begun to experiment with Redclaw, a tropical freshwater crayfish, very similar to marron, but originating from rivers in the gulf country of northern Queensland. The demise of the marron saw the birth of the Redclaw industry.

The inherent advantages of Redclaw were quickly recognised by other farmers and the Queensland Department of Primary Industries (QDPI). This led the QDPI to invest in a large amount of research at the north Queensland Walkamin Freshwater Research Centre. At the same time there was a rapid expansion in the number of Redclaw farms.

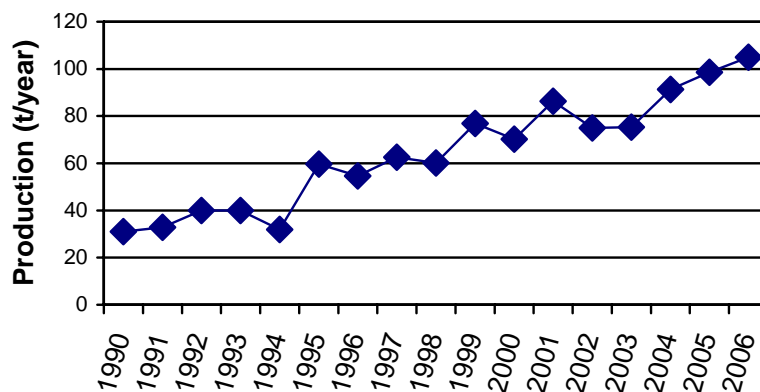
The expansion was typified by small operations of less than 10 ponds. As with most emerging industries, the difficulties with these operations usually saw low production and low profitability. Most have now exited the industry.

The Industry has matured significantly over the last few years. New entrants now more frequently approach entering the industry as a business. As a consequence they put much more effort into doing their background research before making the commitment of an investment.

A direct result is that new entrants look at establishing larger farms - usually in the range of 3 to 10 hectares of ponds.

The size of the industry is steadily increasing. The increased output is a result of increased pond area and increasing productivity.

It should be noted that even at 100 tonnes the industry is still a small industry. Compare this with the Queensland prawn industry at 2500 tonnes, the Queensland beef industry at 400,000 tonnes and the Norwegian farmed Salmon industry at 400,000 tonnes.



Why Redclaw?

Redclaw is a very good species well suited to aquaculture.

- **Simple life cycle.**
It has a simple life cycle with no larval stage development allowing on farm breeding. This provides significant advantages over many other aquaculture species which often require highly specialised hatchery techniques, food sources, hatchery facilities, technical staff and equipment. An additional great advantage is that the farmer himself can undertake selective breeding relatively simply.
- **Robust Animal**
Redclaw tolerate a wide range of water quality. The animal is resilient to upsets in the major water quality parameters which can prevent the disaster of major stock losses should control of water quality be lost temporarily.
- **Production Technology**
The farming techniques and equipment required are simple and straightforward. The skill levels needed are not onerous. Production of Redclaw is supported by proven technology and techniques.
- **High Growth Rate**
As a tropical species, Redclaw exhibits a high growth rate. Redclaw reach market size in less than a year.
- **Stocking Density**
While not a schooling species, Redclaw tolerate high stocking densities and do not attack each other. This allows more efficient use of pond space and makes holding of stock for sale inexpensive.
- **Pond Construction**
Redclaw is unlike a lot of freshwater crayfish in that it does not burrow. This makes pond construction and harvesting easy. The further advantage is its very strong response to flowing water that allows harvesting using a flow trap. Flow trap harvesting requires little capital investment, low labour input, puts minimal stress on the animal and presents clean healthy animals for packaging.
- **Animal Health**
There are minimal disease issues. No medications or chemicals are used in the growing of Redclaw. Farm animal health requirements are simple.
- **Simple dietary requirements.**
Feed pellets are manufactured in standard feed mills used for the production of other land based animal feeds. The major component of the feed is various types of grains. It does not require fish meal or other fish based products and has a low protein requirement.
- **Marketing**
Very importantly, Redclaw are entering a long established market and have a very high consumer acceptance. It is seen as a premium seafood.

Sustainability

Farming Redclaw has a very small environmental footprint

The major reason Redclaw farming has such impeccable environmental credentials is because it is a freshwater species. This allows farms to be located away from the coastal strip which can be environmentally sensitive in a number of ways. Farms can be constructed on land that not highly prized for other purposes and if the operation ceases, then the land can be restored.

Because it uses freshwater the farm can recycle all its water so that it does not become a net user of water. Some farms make use of pond water for irrigation of crops.

Negligible chemicals are used. As mentioned above, the use of grain based feeds provides impeccable sustainability credentials.

The energy use of Redclaw farms is very low. No heavy farm or transport equipment needs to be used so few resources are consumed in the operation of the farm. Redclaw farms are good neighbours.

Typical Farm Operation

Modern farms have a geometric layout to minimise construction and operating costs. Ponds are shaped to drain completely to a sump which has large diameter pipework directing the water to a recycle dam. This is necessary as ponds are harvested regularly by completely draining them. Ponds are typically 20 metres wide, 50 metres long and about 2 metres deep at the drain point and contain about a megalitre of water.

Site Selection

A key factor in the profitability of a Redclaw farm is the selection of a suitable site. The factors influencing the decision would include:

- **Climate**
Redclaw are a tropical species so that the ponds need to be located where water temperatures are close to their natural range. Redclaw farms have been successfully established from Brisbane north.
- **Water supply (quantity and quality)**
It goes without saying that aquaculture will be very difficult without the right supply of water. While Redclaw farming is not a net user of water, compensation for evaporation is required. Redclaw tolerate quite high levels of salinity but concentration due to evaporation needs to be considered.
- **Soil Type**
An essential requirement of any proposed Redclaw farm is a high clay content in the soil to ensure the construction of water tight ponds. It is not economically practical to use pond liners or to transport clay to the site.
- **Topography**
Hilly country makes it difficult to construct an efficient Redclaw farm.
- **Access to facilities and transport / markets**
A much overlooked factor in site selection is the need to have good access to transport and supplies. It is also important that quality of life factors are considered.

Farm Hardware

- **Bird netting.**
The ponds of most successful farms are completely netted to exclude predating birds. A comprehensive support structure is constructed to hold the net in place and to withstand storms. The mesh of the net is usually about 100 mm square. This allows the free movement of the smaller birds such as Magpies, Willie Wag Tails etc., but it keeps out the predatory birds such as Shags and Cormorants.
- **Fencing**
Redclaw ponds are completely surrounded with an impervious fence joined to the side netting. This fence is approximately 500 mm above ground and buried approximately 250 mm into the ground. While it is a license condition that the fence be installed in order to prevent the escape of Redclaw, it is also critical in order to exclude eels and water rats.
- **Jetties**
A jetty in each pond gives access to the drain point and to provide an ideal point to measure water quality.
- **Habitat**
Ponds require habitat within which the animals shelter. These have been provided over the years utilising a variety of systems and materials. These have included discarded tyres, onion bags, prawn net remnants and short lengths of plastic pipe. Plastic pipe habitats appear to be the most appropriate for adult grow out ponds, but are time consuming and expensive to fabricate.
- **Water supply and drainage.**
An extensive pipework system is installed to allow the ponds to be readily emptied during harvesting. It is important to completely drain the pond not only to allow all crayfish to be removed for good stock management, but to enable the ponds to be regularly dried out which is an

important step in the health management regime on the farm. Pond cycles are normally kept to less than twelve months. Pumps and pipework is required to return the water after pond dry out.

- **Aeration**

Aeration is provided 24 hours a day using airlift pumps. Low pressure air from a blower is injected about 700 mm under the water surface and inside vertical airlift pipes. The air bubbles rising inside the pipes push water up the pipes and discharge it at the surface. The airlift pipes extend to within about 200 mm of the pond bottom. Water is thus constantly circulated within each pond.

This system is highly efficient. The circulation not only provides oxygen for the crayfish, but it also eliminates temperature stratification in the pond and allows the crayfish on the bottom of the pond to enjoy much warmer temperatures. This of course has a dramatic effect on the overall growth rates achieved.

- **Flow Trapping**

Redclaw have a very strong response to flowing water with a natural instinct to move upstream. This intrinsic behaviour has been harnessed to develop a very efficient method of harvesting called the flow trap. Flow trapping is carried out overnight when the animals are most active and temperatures are lower.

The flow trap consists of a large open box with a ramp attached to one side. The trap is set up on the edge of the water in the pond with the ramp going down into the water. A steady water stream from a pump is directed into the box. When the box is full, the water flows down the ramp and into the pond. The crayfish detect this water flow, walk up the ramp and fall into the box. If the pond is slowly drained at the same time, virtually all the crayfish in the pond find their way into the trap.

With this method large quantities can be harvested with minimal stress on both the animal and the farmer.

Marketing

Redclaw can survive for extended periods out of water provided they are kept cool and moist. Thus the vast majority of Redclaw are delivered live to market.

The freshness guaranteed by the product being live is a strong market advantage. This particularly applies to Asian restaurants and markets catering to Asian operations, both in Australia and overseas. A disadvantage in transporting live product is the need to have a robust delivery system where the cool chain is not broken.

A further incentive for the selling of live product is that it enables the on-farm facilities to be kept simple. After harvest the Redclaw are sorted into the various size grades (by weight) as required by the customer. Typical size grades would be 30-50 grams, 50-70 grams and 70-100 grams. Crayfish destined for sale are held without feeding in clean aerated water for at least 24 hours to purge all food from their gut. Redclaw can be held for some time in aerated holding tanks as they tolerate quite crowded conditions.

Normally 10 kg of Redclaw are placed in a styro-foam containers with a frozen chill pack and some moist packaging. Provided the boxes are held in a cool place, the Redclaw will be in excellent condition for at least 48 hours.

Selling live also means that there are few health regulations applying to the on-farm handling. A food safety Code of Practice developed by the Redclaw Industry is available for use. This Code of Practice adds little to the workload of a typical farmer.

Over the years some Redclaw has been successfully exported. However most export markets require larger quantities than the current industry is able to supply.

Industry Information

The Queensland Department of Primary Industries has provided excellent industry support over the years and has a number of publications essential for the Redclaw farmer (www.dpi.qld.gov.au). There are a number of industry extension officers within the QDPI who are passionate and knowledgeable about Redclaw available to give advice.

Existing farmers are keen to support new entrants to the industry in order to see it grow. The Queensland Crayfish Farmers Association (www.queenslandredclaw.org) provides a convenient contact point for new entrants.