

**AUSTRALIAN FRESHWATER
CRAYFISH GROWERS**

*National Research Priorities
1994/95*

**Prepared by
National Working Group
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1. Summary

The Australian Freshwater Crayfish Industry covers all mainland states and includes three species

- Redclaw *Cherax quadricarinatus*
- Marron *Cherax tenuimanus*
- Yabbies *Cherax destructor/albidus*

Early in 1994 it was recognised that greater coordination was needed across the industry, in particular with reference to research priorities and programs.

A working group was formed and national priorities developed around four broad issues

- Marketing
- Post Harvest/Handling
- Production
- Economics

Highest priority was given to research programs addressing the following marketing issues

- Coordination
- Establishment of quality standards and a quality assurance program

and the following production issues

- Pond Ecology
- Management Issues
- Biology

It is hoped that industry can work closely with research institutions to develop relevant research programs to assist future development.

It was also recognised that the industry must initiate some activities, particularly

- Regular assessment of production and limits to development
- Establishing relationships with non-biological research centres such as engineering faculties

2. Introduction

In April 1994 the Australian Freshwater Crayfish Growers held a national workshop in Adelaide. At the workshop it was recognised that there was considerable overlap between research projects being undertaken within the industry and that there was a need for more coordination between States. A national working group was elected with the charter to determine

- National Research Priorities
- Possible National Coordination of Activities
- National Affiliation of Associations and Industries

Following support from the Fisheries Industry Research and Development Corporation, the working group met in Brisbane in August 1994 to address these issues.

Current research projects of relevance to the industry were identified as well as expertise which could be drawn upon in future research projects.

Each State identified research priorities within their particular industries and these were then distilled to produce national priorities for the industry.

Four broad categories of research were identified as follows

- Marketing
- Post Harvest/Handling
- Production
- Economics

Individual projects were prioritised within each broad category.

This report details the results of this process and gives direction to future research activities associated with the industry. The report will be made available to research funding organisations, research institutions and industry and aims to assist in the development of relevant, industry driven research programs.

It is recommended that this report be revised by industry at least every 2 years to keep pace with industry developments.

3. National Research Priorities

Research programs identified by each State have been used to generate a listing a relative importance of research programs across all industries. Individual projects have been combined in many cases under general categories.

3.1 Marketing

All of these were considered to be of a high priority but are listed in decreasing importance.

3.1.1 Coordination

There is a general recognition of the need to better coordinate marketing between states and even between species. Low overall volumes mean that market continuity can only be achieved through a more coordinated approach.

3.1.2 Quality Standards

Little work has been done on identifying and coordinating quality standards within the industry. Clear identification of standards and the introduction of a quality assurance program is seen as essential as the industry develops.

3.1.3 Import Requirements

While most in the industry recognise the goal of exporting their product, little is known of many of the export markets in terms of requirements. A market analysis of targeted markets is seen as beneficial to developing a market-oriented approach within the industry.

3.1.4 Market Identification

While some markets have been identified there is still much to be done in identifying real markets from perceived or potential markets.

3.1.5 Value-added product development

At present the industry as a whole has only attempted to sell live product with differences only relating to size. Effort should be placed into identifying possible processed products and their economic viability.

3.2 Transport/Post Harvest

3.2.1 Transport - High priority

Little is known of the changes in product as it is transported and how different transport practices affect quality of product. Information has generally been accumulated by individuals and is not available to the wider industry.

3.2.2 Holding facilities - High priority

Due to the nature of the industry and the reliance on live product, holding facilities are essential in maximising returns. Most facilities have been developed by individuals with little detailed research having been undertaken into improving holding facilities.

3.2.3 Packaging/Processing - High priority

Alternative methods of packaging and processing freshwater crayfish could be investigated, perhaps in conjunction with engineering and catering schools.

3.2.4 Handling - Medium priority

Handling of the product has been identified as having vast implications on its final quality and therefore value. Handling practices both at the farm level and the holding and marketing level should be investigated.

3.3 Production

3.3.1 Pond Ecology - High Priority

The need for a better understanding of the ecology of pond systems was identified as being the prime concern in getting better production levels. There is a requirement for detailed studies of the following aspects in commercial pond systems. The three topics are interrelated and studies should investigate relationships between them.

- Water Quality Management

There is a need to better understand the dynamics of water ecology in pond systems, characterising plankton populations, their influence on crayfish production and ways of controlling and utilising them within the management regime.

Effects of specific water quality parameters on crayfish production should also be investigated with a view to determining optimal water quality levels.

- Substrate/Benthic Community Dynamics

The relationship between crayfish and the pond substrate, particularly in terms of maximising and sustaining production should be investigated. Nutrient and biological alterations of the substrate following submergence in relation to the provision of nutrition to crayfish requires further work. The impact of accumulation of waste products should also investigate suitable management techniques and strategies.

- Stock Management

The dynamics of crayfish populations in pond systems, the effects of these on production and optimum management strategies need to be understood.

3.3.2 Management - Medium priority

General management practices are not standard between industries and even within industries there are very different approaches to the basics. Interaction between industries and states should be encouraged on these issues but studies which document the alternatives, advantages and disadvantages of the following would be regarded as beneficial.

- **Harvesting** - both methods and equipment
High
- **Refuges** - their design, use and usefulness
High
- **Pond Design** - limitations and considerations
High
- **Parasites** - possible methods of control or management, particularly of temnocephalids which affect market value
Medium-High
- **Polyculture** - alternative species, management and relative success
Medium
- **Predators** - control methods
Medium
- **Aeration** - methods, efficiency and relative benefits
Low

3.3.3 Biology - Medium priority

A number of basic biological aspects of all species are still not understood. Those of high priority are

- Characterising behavioural traits such as burrowing, activity and movement within ponds. This work could be linked to different pond conditions.
High
- Clearly identifying nutritional aspects of the animals. This would involve looking at the changing nutritional requirements with age as well as investigating better ways of providing these in pond systems.
High
- Selective breeding trials to generate superior strains for farming
Medium
- Genetic manipulation of animals to control reproduction and possibly growth
Medium
- Methods of inducing moulting
Medium

3.4 Economics - High Priority

It was recognised that the industry needed to do some work prior to these projects being implemented.

3.4.1 Economic analysis

One of the major limits to industry expansion is the lack of access to finance. There is a need for a complete economic analysis of the industries which can be used to attract finance.

3.4.2 Industry Analysis

The lack of accurate information relating to the status of the industry was identified as a limiting factor in industry development. It was suggested that industries should undertake regular assessments of their development and identify impediments to development. these assessments should be documented so relevant State-based management authorities can consider them and take appropriate action.

Appendix 1: Research Expertise in Australia

The following research institutions were identified as having expertise in freshwater crayfish farming.

Western Australia

- Fisheries Department of Western Australia
Contact: Dr Noel Morrissy
- University of Western Australia
Contact: Dr Brenton Knott
- Curtin University
Contact: Dr Louis Evans

South Australia

- University of Adelaide
Contact: Dr Mike Geddes

Victoria

- Deakin University
Contact: Dr Chris Austin
- Victorian University of Technology
Contact:

Queensland

- Department of Primary Industries
Contact: Dr Clive Jones
- University of Queensland
Contact: Dr Don Fielder
- James Cook University
Contact: Dr Norm Millward/Brett Edgerton
- Queensland University of Technology
Contact: Dr Peter Mather/Dr Alex Anderson

Appendix 2: Current Research Projects

At present there are four major research projects on freshwater crayfish farming in Australia, two funded by FRDC.

Enhancement of Yabbie Production from Western Australian Farm Dams

Supervisor Dr Noel Morrissy
Department Fisheries Department of Western Australia
Funding Body FRDC
Contact Craig Lawrence

A Study of Nutrition, Husbandry and Stock Comparison in Redclaw Redclaw/Silver Perch Polyculture

Supervisor Dr Clive Jones
Department Primary Industries Queensland
Funding Body FRDC
Contact Dr Clive Jones

Heritability of Growth Rate in Redclaw

Supervisor Dr Clive Jones
Department Primary Industries Queensland
Funding Body Aquaculture CRC
Contact Dr Clive Jones

Establishment of a Model Redclaw Farm

Supervisor Dr Clive Jones
Department Primary Industries Queensland
Funding Body DPI
Contact Dr Clive Jones

In addition there are numerous higher degree research programs currently underway including

Increasing Production in Marron Farms on Kangaroo Island

Supervisor Dr Mike Geddes
Department University of Adelaide
Funding Body DEET
Contact Tara Ingerson

Marron Farming on Kangaroo Island

Supervisor Dr Mike Geddes
Department University of Adelaide
Funding Body DEET
Contact Dr Mike Geddes

Prospects for the Commercial Polyculture of Marron and Silver Perch

Supervisor Dr Louis Evans
Department Curtin University
Funding Body Curtin University PhD Program
Contact Mr G Whisson

Cadmium Toxicity Investigations in Marron

Supervisor Dr Louis Evans
Department Curtin University
Funding Body Curtin University PhD Program
Contact Ms M Chambers

Nutrition and Stocking Density Studies in Cultured Marron

Supervisor Dr Louis Evans
Department Curtin University
Funding Body Curtin University PhD Program
Contact Mr R Fotedar

Genetic Studies in Marron

Supervisor Dr Louis Evans
Department Curtin University
Funding Body Curtin University PhD Program
Contact Mr J Ingram

Influence in Feeding regime on the biological responses of marron reared with commercial diets in an intensive culture system.

Supervisor Dr Louis Evans
Department Curtin University
Funding Body Curtin University PhD Program
Contact Ms M Santelices

To characterise Cherax baculovirus (CBV) and to produce CBV-free crayfish stocks

Supervisor Dr Leigh Owens
Department James Cook University
Funding Body James Cook University PhD Program
Contact Mr B Edgerton

Development of monosex broods of yabbies

Supervisor Dr Brad Mitchell
Department Deakin University
Funding Body Deakin University PhD Program
Contact Mr T McRae

Formulation of cost effective diets for yabbies

Supervisor Dr Brad Mitchell
Department Deakin University
Funding Body Deakin University PhD Program
Contact Mr P Jones

Semi-intensive pond production of yabbies

Supervisor Dr Brad Mitchell
Department Deakin University
Funding Body Deakin University PhD Program
Contact Mr J Chavez

Studies on the immune defence systems of yabbies

Supervisor Dr Brad Mitchell
Department Deakin University
Funding Body Deakin University Honours Program
Contact

Genetic evaluation of strains of yabbies for aquaculture

Supervisor Dr Chris Austin
Department Deakin University
Funding Body Deakin University Honours Program/Industry
Contact

In addition there are projects at

- James Cook University supervised by Dr Norm Millward
- University of Queensland by Dr Don Fielder
- Queensland University of Technology by Dr Peter Mather

Appendix 3: Research Priorities by State

Representatives from each State involved in freshwater crayfish farming were invited to produce a list of research priorities for the industry(ies) in their State. The following summarises these programs. The programs are not listed in any order of priority.

Western Australia

Coordination of marketing

The mechanics of postharvest handling
Design of handling, holding and packaging facilities

South Australia (Yabbies)

Design of handling, holding and packaging facilities

Developing sustainable production techniques
Investigations of behavioural biology, in particular burrowing
Management of waste products in ponds
Management and control of population densities and structures
Increasing national production levels
Determining site selection criteria

South Australia (Marron)

Coordination of marketing
Production of national quality standards and quality assurance programs

Investigating ways of increasing production levels
Developing sustainable production techniques
Production of an industry analysis
The development of demonstration or model farms and farming practices

Production of an economic analysis or model

Victoria

Harvesting and trap design
Investigations of behavioural biology, in particular burrowing
Genetic improvement of stock
Predator control

Production of an economic analysis or model

Queensland

Identifying import requirements for selected export markets
Identification and characterisation of new markets

Investigating the mechanics of postharvest handling

The feasibility and practicalities of polyculture

Feeds, feeding, fertilising, bioaugmentation

Harvesting and trap design

The benefits of artificial habitats in ponds

Moulting behaviour and ways of inducing moulting

Understanding and controlling juvenile production

Characteristics and considerations of pond design

Toxicity studies

Water management both in quality and efficiency

Management of shell discolouration/parasites/disease

Increasing investment in the industry

Appendix 4: Working Group Members

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