

SHELLFISH DISEASES WORKSHOP

**SALAMANDER BAY, NSW
6 - 10 DECEMBER 1993**

**Fisheries Research and Development Corporation
Project 93/131**

FINAL REPORT

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FINAL REPORT

Prepared by :

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REPORT

A 5-day, intensive Shellfish Diseases Workshop was held at NSW Fisheries' Brackish Water Fish Culture Research Station, Salamander Bay, from 6-10 December 1993.

The workshop was organised by Sub-Committee on Fish Health, a sub-committee of Animal Health Committee. It was attended by laboratory diagnosticians and researchers with major service and/or research commitments in the area of shellfish diseases. Prior to the workshop, most of these workers had little, if any, formal training in invertebrate pathology.

The objectives of the workshop were :

- * to provide training in general pathology of molluscs and crustaceans
- * to enable recognition of major exotic and endemic diseases of molluscs and crustaceans

The complete workshop program is shown in Appendix I.

Core components were presented by invited experts:

- * Dr R A Elston, Battelle Marine Research Laboratory, Washington, USA (molluscs)
- * Dr D V Lightner, University of Arizona, USA (crustaceans)

The summarised contents of the molluscan and the crustacean components are shown in Appendices II and III, respectively.

To supplement these core components, Australian participants presented comprehensive reviews and updates on major endemic diseases; subjects presented are listed in Appendix IV.

There were 15 participants for the mollusc component and 12 for the crustacean component. Participant numbers and levels of expertise matched pre-workshop expectations; during the planning stages, approximately 12 participants had been expected for each component. A complete list of participants is presented in Appendix V.

Conclusion

The invited experts covered a large body of information on diseases of molluscs and crustaceans in considerable detail. All participants worked enthusiastically to assimilate the material presented. Participants and invited experts agreed the workshop was successful and met its objectives.

APPENDIX I

WORKSHOP PROGRAM

MOLLUSCAN COMPONENT

Monday 6/12

8:15 *Welcome; formalities*

8:30 **Lecture** - Overview of mollusc aquaculture in Australia (J. Nell)

9:00 **Lecture** - Gross anatomy of molluscs (R. Elston)

10:00 *Coffee Break*

10:15 **Practical Session** * Gross anatomy, haematology (R. Elston)

* Mystery case (R. Elston)

* *Polydora* infestation (P. Hone)

12:30 *Lunch*

1:00 **Lecture** - Molluscan disease processes (R. Elston)

2:00 **Practical Session** - Microscopic anatomy and diseases (R. Elston)

5:00 *Break, return to accommodation until evening session*

7:30 **Evening Session** - Presentations/discussions (15 min/5 min each)

Current shellfish disease issues in W.A. (M. Hine)

Bonamiasis in Victoria (G. Rawlin)

QX disease (T. Anderson)

Bonamiasis-the Tasmanian experience (J. Handlinger)

Winter mortality (T. Anderson)

Tuesday 7/12

- 8:30 Lecture** - Diseases of larval and juvenile molluscs (R. Elston)
- 9:30 Practical Session** - Histopathology (R. Elston)
- 12:30 Lunch**
- 1:00 Lecture** - Diseases of adult molluscs (R. Elston)
- 2:00 Practical Session** - Histopathology (R. Elston)
- 3:00 Coffee Break**
- 3:30 Presentations/discussions** (15 min/5 min each)
- Diseases of pearl oysters and giant clams (J. Norton)
 - Perkinsus olseni* infection (T. Anderson)
 - Polydora* research and management issues in abalone and oyster culture (P. Hone)
 - Anatomy and host-parasite relationships of *Bonamia* sp. (M. Hine)

Wednesday 8/12

- 8:30 Lecture** - Management of mollusc diseases in intensive systems (R. Elston)
- 9:30 Presentations/discussions** (15 min/5 min each)
- Sydney rock oyster spat mortality (R. Callinan)
 - Bacterial diseases of larval scallops (M. Heasman)
- 10:10 Coffee break**
- 10:30 Inspect station hatchery**
- 11:30 Practical session** - Histopathology (R. Elston)
- 12:30 Lunch**

Wednesday 8/12 (continued)

CRUSTACEAN COMPONENT

1:00 Lecture - Overview of crustacean aquaculture in Australia (I. Anderson, L. Owens)

1:30 Lecture - Gross and microscopic anatomy ,including larval stages

(D. Lightner)

2:30 Practical session - Gross and microscopic anatomy; fixation

and cutting in; haematology and bacteriology techniques (D. Lightner)

5:30 Break, return to accommodation

Evening - Workshop Dinner

Thursday 9 /12

8:30 Lecture - Defence mechanisms of penaeid prawns (D. Lightner)

9:00 Lecture - Viral diseases of penaeid prawns (D. Lightner)

12:30 Lunch

1:00 Lecture - Bacterial and fungal diseases of penaeid prawns (D. Lightner)

2:00 Practical Session - Histopathology (D. Lightner)

5:00 Break, return to accommodation until evening session

7:30 Evening Session - Presentations/discussions (15 min/5 min each)

IHHNV in Australia (L. Owens)

Bacterial disease in Australian prawn hatcheries (I. Anderson)

New baculovirus from *Penaeus monodon* (K. Spann)

Spawner mortality syndrome (L. Owens)

Friday 10 /12

8:30 Lecture - Parasitic diseases and fouling of penaeid prawns (D. Lightner)

9:30 Practical Session - Histopathology (D. Lightner)

12:30 Lunch

1:30 Lecture - Management of marine prawn diseases in intensive systems
(D. Lightner)

2:30 Lecture - Diseases of crabs and freshwater crustaceans (I. Anderson, L. Owens)

3:00 Finish

APPENDIX II
SHELLFISH DISEASE WORKSHOP - MOLLUSCAN COMPONENT

R Elston

The emphasis of this course is on diagnosis, prevention and management of infectious diseases of molluscs. The intention is therefore very practical in nature. Molluscan disease diagnosis is largely based on anatomical pathology - gross and microscopic evaluation of tissues and lesions - although biochemical, microbiological and molecular tools are being developed for diagnostic purposes and some of these will likely gain widespread use in the near future. Nonetheless, we will emphasise current technology in this course with the significant benefit to the student that once anatomical and pathogenetic aspects are understood, they will be well prepared to take on challenging diagnostic and management problems in the molluscan field.

We will cover gross and microscopic anatomy, host response to diseases, specific infectious diseases and management of infectious diseases in intensive husbandry systems.

(1) LECTURE - Gross and microscopic anatomy of selected molluscs.

Life cycle and development of molluscs (Oyster, clam, scallop, mussel and abalone)

Larval stage

Metamorphosis

Juvenile stage

Adult stage

(2) LABORATORY - Gross and microscopic anatomy

Life cycle and development of molluscs (oyster, clam, scallop, mussel and abalone)

Larval stage

Metamorphosis

Juvenile stage

Adult stage

- (2) **LABORATORY - Gross and microscopic anatomy**
Gross dissections - identify major organ systems in adults.
Microscopic examination of larval molluscs as available.
Obtaining blood for clinical examination, preparation of blood smears.
- (3) **LECTURE - Host response in molluscs**
Brief overview of invertebrate host responses - defining invertebrate "inflammation"
Molluscan self-defence mechanisms
 Soft tissue response - hemocytic infiltration
 Capability for tissue repair
 Hemocyte function, reproductive follicle resorption
 Nocardiosis as example
 Hard tissue - inflammation and repair
 European flat oyster shell disease
- (4) **LABORATORY - normal microscopic anatomy and introduction to pathologic anatomy**
 Histologic identification of normal structures in larval, juvenile and adult forms.
 Examination of blood smears.
- (5) **LECTURE - Diseases of larval and juvenile molluscs**
 Larval diseases
 vibriosis in various mollusc species and abalone
 oyster velar virus disease (OVVD)
 herpes-like virus disease
 invasive ameboflagellate disease
 Juvenile diseases
 vibriosis in abalone
 ligament disease
 invasive ciliate disease

(6) **LABORATORY - Histological evaluation of larval, juvenile and adult mollusc diseases**

(7) **LECTURE - Diseases of adult molluscs**

Perkinsus disease of oysters and abalone

Haplosporidian diseases of oysters

MSX, SSO, others

"Denman Island Disease"

"Korean Egg Parasite"

Bonamiasis

Marteiliasis

Brown ring disease

Disseminated neoplasia of bivalves

RLO - rickettsia-like organisms

Trematode infestations in bivalves

(8) **LABORATORY - Histological evaluation of adult mollusc diseases**

(9) **LECTURE - Management of molluscan diseases in intensive systems**

APPENDIX III
SHELLFISH DISEASE WORKSHOP - CRUSTACEAN COMPONENT

D Lightner

(1) LECTURE - Gross and microscopic anatomy of penaeid prawns

Larval stages

Postlarvae, juveniles

Adults

(2) LABORATORY - Anatomy, pathology techniques

Gross and microscopic anatomy

Cutting in and fixation

Haematology techniques

Bacteriology techniques

(3) LECTURE - Crustacean defence mechanisms

Definitions

PPO system, lectins

Functions

Haemocytes

(4) LECTURE - Virus diseases

IHHNV, including RDS

HPV

LPV

Reoviruses

LOVV

Iridoviruses

Baculoviruses, including yellowhead virus

(3) LECTURE - Bacterial and fungal diseases

Bacterial shell disease

Bacterial infections in hatcheries

Seagull syndrome

Septic hepatopancreatic necrosis

Rickettsial infections

Necrotising hepatopancreatitis

Lagenidium sp.

Sirolopidium sp.

Fusarium sp.

(4) PRACTICAL - Histopathology session

Typical sections of all major diseases examined by participants

(5) LECTURE - (1) Parasitic diseases and fouling of penaeid prawns

(2) Taura syndrome

(3) Management of intensive systems

Microsporidians

Gregarines

Fouling organisms

Protozoa

Bacteria

Blue-green algae

Algae

Taura syndrome

Management of intensive systems

Principles outlined

(6) PRACTICAL - Histopathology session

Typical sections of all major diseases examined by participants

APPENDIX IV
SHELLFISH DISEASE WORKSHOP - AUSTRALIAN CONTRIBUTORS

Molluscan component

Lecture

Overview of mollusc culture in Australia J. Nell

Presentations

<i>Polydora</i> infestation	P. Hone
Current shellfish disease issues in W.A.	M. Hine
Bonamiasis in Victoria	G. Rawlin
QX disease	T. Anderson
Bonamiasis-the Tasmanian experience	J. Handler
Winter mortality	T. Anderson
Diseases of pearl oysters and giant clams	J. Norton
<i>Perkinsus olseni</i> infection	T. Anderson
<i>Polydora</i> research and management issues in abalone and oyster culture	P. Hone
Anatomy and host-parasite relationships of <i>Bonamia</i> sp.	M. Hine

Crustacean component

Lectures

Overview of crustacean aquaculture in Australia	I. Anderson, L. Owens
Diseases of crabs and freshwater crustaceans	I. Anderson, L. Owens

Presentations

IHHNV in Australia	L. Owens
Bacterial disease in Australian prawn hatcheries	I. Anderson
New baculovirus from <i>Penaeus monodon</i>	K. Spann
Spawner mortality syndrome	L. Owens

APPENDIX V

SPEAKERS

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