



GROWTH, REPRODUCTION, AND SOME ASPECTS OF  
BEHAVIOUR OF JASUS LALANDEI MILNE-EDWARDS.

by

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## CONTENTS

1. Introduction.
2. Methods for catching and keeping crayfish.
  - 2.1 Aquarium-equipment.
    - 2.11 Aquaria.
    - 2.12 Air supply.
    - 2.13 Water supply.
    - 2.14 Maintenance of water-pipes.
    - 2.15 Refrigeration.
    - 2.16 Maintenance of aquaria.
  - 2.2 Collection of experimental animals.
  - 2.3 Methods of transportation.
  - 2.4 Selection of experimental animals.
  - 2.5 Tagging in the laboratory.
  - 2.6 Feeding.
  - 2.7 Shelter.
  - 2.8 Care of crayfish through moult.
  - 2.9 Death of captive crayfish.
    - 2.91 Lethal temperature.
    - 2.92 Anoxia.
    - 2.93 Desiccation.
    - 2.94 Death at moult.
    - 2.95 Poisoning by heavy metals.
3. Behaviour.
  - 3.1 Components of shelter.

3.2 A dominance order for shelter.

3.3 Food and feeding.

3.31 Natural food.

3.32 Mechanism of feeding.

3.33 Detection of food.

3.34 General patterns of feeding.

3.35 Preferential feeding.

3.36 Feeding rhythms.

3.360 Introduction.

3.361 Normal diurnal period of light and dark.

3.362 Reciprocal of normal diurnal period of light and dark.

3.363 Acclimatization to normal diurnal period of light and dark followed by constant light.

3.364 Acclimatization to normal diurnal period of light and dark followed by constant darkness.

3.365 Acclimatization to normal diurnal period of light and dark followed by alternating 6 hour periods of light and dark.

3.366 Acclimatization to alternating 6 hour periods of light and dark followed by constant light.

3.367 Acclimatization to alternating 6 hour periods of light and dark followed by constant darkness.

3.37 Shelter and feeding activity.

3.4 Locomotor activity.

4. Growth.

4.0 Introduction.

4.1 Linear relationships.

4.11 Definitions.

4.12 Comparison of measurements.

4.2 Moulting.

4.21 The moulting cycle.

4.22 Ecdysis.

4.23 Change in weight at moult.

4.24 Uptake of water at moult.

4.25 Temperature and growth.

4.251 Temperature of water and moulting.

4.252 Temperature and the period of inter-moult.

4.26 Size and moulting.

4.3 Growth of captive animals.

4.31 Growth by weight.

4.32 Growth by length.

4.33 Growth of animals maintained for one year.

4.34 Loss of appendages and growth.

4.35 Moulting without growth.

- 4.4 Validity of data.
- 4.5 Discussion.
- 4.6 Tagging.
- 5. Reproduction.
  - 5.0 Introduction.
  - 5.1 Materials and methods.
  - 5.2 The female.
    - 5.21 General description of the reproductive organs.
    - 5.22 Classification of ovarian stages.
    - 5.23 Histology of the ovary.
    - 5.24 Histology of the ovarian stages.
    - 5.25 Histology of the oviduct.
    - 5.26 The annual ovarian cycle.
    - 5.27 Size at sexual maturity.
    - 5.28 Development of ovigerous setae.
    - 5.29 Number of eggs carried by females in berry.
  - 5.3 The male.
    - 5.31 General description of the reproductive organs.
    - 5.32 Stages in maturation of the testis.
    - 5.33 Histology and development of the testis.
    - 5.34 Anatomy of the vas deferens.
    - 5.35 Size at sexual maturity.
  - 5.4 Mechanism of fertilization.
  - 5.5 Abnormal development of the reproductive system.

6. Management of the fishery.

6.0 Introduction.

6.1 Regulations and their effect on a fishery.

6.2 History of protective legislation for crayfish in  
South Australia.

6.3 The commercial importance of the crayfishery.

6.4 Factors promoting overfishing of J.lalandei.

6.5 Evidence of overfishing.

6.6 An analysis of present regulations.

6.7 Recommended changes in regulations.

6.8 Recommendations for future research.

7. Acknowledgements.

8. References.

## SUMMARY

The methods used to catch and transport samples of the crayfish Jagus lalandei and to maintain them in aquaria are discussed.

Experiments to determine some aspects of behaviour related to obtaining food and shelter are described. Crayfish tend to occupy shelters that offer a tactile stimulus and a light-gradient. If shelter is limited, the available shelter is occupied and retained according to a dominance order. Such a dominance order was demonstrated in groups of crayfish approximately equal in size and large animals dominated smaller ones. Sex did not play an important role in the establishment of a social hierarchy.

Crayfish feed preferentially, selecting marine types of bait such as fish, shark or squid before terrestrial baits such as horsemeat and rabbit. Fresh baits are taken in preference to stale baits.

The feeding behaviour of crayfish is rhythmic. Captive animals remain dormant in their shelters during most of the hours of daylight. Feeding activity is greatest at dusk, increasing significantly from a low level an hour before and decreasing to a relatively low level two hours following. Little evidence of this pattern of behaviour could be detected in constant light or darkness. During alternating 6 hour periods of light and darkness,

feeding is maintained at a high level during dark periods, decreasing to a low level during light periods. No residuum of this pattern of behaviour was evident in constant light or darkness. The cycle of feeding activity is therefore essentially an exogenous rhythm.

Lack of shelter does not markedly influence the cycle of feeding activity of captive crayfish. The pattern of locomotor activity corresponds quite closely to the pattern of feeding activity under the same conditions of light and darkness.

Measurements of length used by other authors are compared and conversion factors calculated. Weight is proportional to the cube of the carapace-length.

The moulting cycle and physical changes occurring at ecdysis are described. Captive crayfish increase significantly in weight two days before moult and animals 5 to 7 cm. in carapace-length increase by about 13.5 per cent on the day following moult, whilst crayfish 8 to 9 cm. in carapace-length increase by about 5.5 per cent. Weight then increases slowly, becoming stable 35 days following moult. The average percentage of water absorbed at moult by crayfish 5 to 9 cm. in carapace-length is 18.3. The frequency of moulting increases with increasing temperature and small animals moult more frequently than larger ones. An estimate of growth by



length and weight, per moult and per annum for crayfish 4 to 10 cm. in carapace-length is given. Growth at moult is reduced if missing appendages are regenerated. A plastic dart-tag was tested successfully in the laboratory.

Morphological and histological changes are used to describe the ovarian cycle. The development of ovigerous setae is described and their presence is used as an index of sexual maturity in females. A small proportion of female crayfish are mature at 8.5 cm. in carapace-length, but the proportion does not approach 100 per cent until 12 cm. in carapace-length. The number of eggs carried by females, calculated by a volumetric method varies from 85,000 at 9.3 cm. to 362,000 at 13.9 cm. in carapace-length.

The histology and development of the testis is described and compared with the description given for Panulirus pencillatus by Matthews (1951). An attempt is made to describe the method of fertilization from a study of the genital organs.

Some factors influencing the exploitation of crayfish in South Australia are discussed. Past and present protective regulations are analysed and some suggestions made regarding future conservation.

~~-----~~ This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

