

**Aspects of the Biology and Ecology
of Six Temperate Reef Fishes
(Families: Labridae and Monacanthidae)**

Neville Scott Barrett, BSc. (Hons.)

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Statements

I declare that this thesis contains no material which has been accepted for the award of any other degree or diploma in any tertiary institution and, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text.

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Abstract

The currently most accepted population theory for reef fish was developed on tropical reefs and suggests that populations of most reef fish species are limited primarily by recruitment, with little post-recruitment resource limitation. I tested the validity of this theory for temperate reef fishes by examining growth rates in six common species from a number of isolated populations for evidence of resource limitation. If resources are limiting, spatial and temporal variation in recruitment and mortality should lead to isolated populations experiencing differing levels of resource availability, particularly food availability, which will be reflected in growth rates. I worked with six of the most common reef fishes found in Tasmanian waters so that any findings would form the basis of a broadly applicable model. These were *Notolabrus tetricus*, *Notolabrus fucicola*, *Pictilabrus laticlavius*, *Pseudolabrus psittaculus*, *Penicipelta vittiger*, and *Meuschenia australis*.

Before examining growth rates it was first necessary to define the scale at which populations could be considered to be isolated. The short and long-term movement patterns of each species were studied using visual observations to interpret short-term patterns, and recaptures of tagged fish to interpret the long-term patterns.

Methods of ageing each species were developed and validated, with growth rates of tagged fish being used to validate the use of otoliths for ageing. General growth curves are presented.

For most of the species, there was some uncertainty in current texts about the sexual system used and the relationship between sex and dichromatism and dimorphism. To clarify this situation the reproductive biology of each species was examined. The relationship between sex and growth rate was also examined.

For two species (*N. tetricus* and *N. fucicola*) annual growth data from tagged fish were obtained over a 3-4 year period, allowing inter-annual growth variability to be examined. As well as providing an insight into the variability of growth with time, these results also aid in the interpretation of growth curves determined from otolith ageing.

In all species investigated, no significant differences in growth rates were detected between populations occupying similar habitats and subject to similar environmental conditions. These results suggest that post-recruitment resource limitation in the form of food limitation may not be an important factor influencing the post recruitment growth and survival of many temperate reef fishes with pelagic larval stages. This agrees with the assumptions made, but rarely tested, in current theories concerning the regulation of populations of reef fish, particularly those on temperate reefs.

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