

University of Newcastle

**The Reproductive Biology and Spawning Behaviour
of *Chromis hypsilepis* (Pisces: Pomacentridae)**



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BSc

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Dedication

I dedicate my thesis to my Great Uncle Tom, may he rest in peace. He was a wonderful family man, and the reason why I had the ability to study and get my degree wherever and however I wished. Thank you, and let your soul be forever blessed for the things you did for the family and the world.

RIP Thomas Thewes

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I owe my success to having listened respectfully to the very best advice, and then going away and doing the exact opposite. ~ GK Chesterton

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Abstract

Fishes of the family Pomacentridae utilize a great range of reproductive strategies, although most research has focussed on tropical species. *Chromis hypsilepis* is a schooling planktivore that occurs on temperate rocky reefs from northern New South Wales to northern Tasmania. During the summer breeding season, large numbers of *C. hypsilepis* migrate to spawning aggregation sites. This spawning strategy is unusual in the family Pomacentridae and demersal spawning is very uncommon among fishes that form spawning aggregations. This study was undertaken to fill the gap in understanding of the reproductive biology of *C. hypsilepis* and to provide detailed descriptions of the reproductive behaviour as part of improving the understanding of this unusual reproductive strategy. Age, growth, sexual maturity and reproductive behaviour of *C. hypsilepis* were described from a population at Terrigal, New South Wales. The length and age at sexual maturity were also compared to a population at Jervis Bay, 200 km south of Terrigal. *C. hypsilepis* is gonochoristic and occurred in a 1:1 sex ratio. The use of bands in the sagittal otoliths of *C. hypsilepis* as a measure of age was validated with marginal increment analysis. A maximum age of 22.5 years was recorded. Males and females, respectively, attained sexual maturity at 75.2 and 89.2 mm SL at Terrigal, corresponding to ages of 1.9 and 2.0 years. Von Bertalanffy growth models showed that males and females attained 50% of their asymptotic length within 1-2 years. There was minimal variation between the Terrigal and Jervis Bay populations. Spawning behaviour was described using mounted underwater video cameras, recording up to 11 hours per day. Spawning was acyclic. Spawning occurred throughout the day, building up during the morning hours to a peak at midday and dramatically dropping in frequency throughout the rest of daylight hours. The results of this study are a necessary component of understanding the unique reproductive strategy of *C. hypsilepis*.

Abbreviations

T_{50}	Age at which 50% of population become sexually mature
cm	Centimetre
DPI	Department of Primary Industries
g	Grams
>	Greater than
\geq	Greater than or equal to
GSI	Gonadosomatic Index
L_{50}	Length at which 50% of population become sexually mature
<	Less than
\leq	Less than or equal to
MIA	Marginal Increment Analysis
Max	Maximum
μm	Micrometer
mm	Millimetre
min	Minimum
n	Sample size
sec	Seconds (time)
SE	Standard error
SL	Standard length
%	Percentage
W_{50}	Weight at which 50% of population become sexually mature

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