Biology of the Foxfish *Bodianus frenchii*, an exceptionally long-lived, monandric protogynous labrid, including regional comparisons

**Bodianus frenchii**

- Medium-sized (480mm TL) temperate labrid
- In sub-genus *Verreo*, which contains 7 temperate *Bodianus* species
- Excellent eating and thus targeted by recreational fishers
- Unusual disjunct distribution in southern half of Australia
- Environment of lower west and south coasts of WA differ

Photo: Barry Hutchins
Some characteristics of labrids

- Very speciose family
- Found in both temperate and tropical waters and often over reefs
- Species mainly short lived
- Maximum age is 70 years for the temperate *Achoerodus gouldii*
- Many species are protogynous hermaphrodites, *i.e.* change sex from female to male
- Carnivorous
Ageing of *Bodianus frenchii*

- Number of opaque zones in sectioned otoliths
- Marginal increment analysis validated that a single opaque zone is formed annually in otoliths
- Schnute growth curves fitted to lengths at age
Age and Growth

Maximum age is 78 years!

Several fish > 50 years old

Rapid initial growth on both coasts

Lengths at age typically greater on the south than west coast
Lower west coast
$L_{50} = 245\text{mm}$, 50% mature by 8-9 years, 100% mature in fish $> 279 \text{ mm}$

South coast
$L_{50} = 236\text{mm}$, 50% mature by 4-5 years, 100% mature in fish $> 237 \text{ mm}$

Maturity attained at similar lengths on both coasts

Maturity attained at a younger age on the south coast

Reflects faster growth on south coast
Lengths and ages at sex change

Strong trend in increasing prevalence of males with both length and age

Lower west coast
smallest male = 291 mm,
$L_{50} = 327$mm, $A_{50} = 28.7$ years,

South coast
smallest male = 245mm,
$L_{50} = 365$mm, $A_{50} = 29.2$ years

Sex change attained at similar ages on both coasts ($p > 0.05$)

Sex change attained at a greater length on the south coast ($p < 0.001$)

Sex change related more to age than length
Protogyny

- Length by which all females are mature is less than the length of the smallest male

- This provides strong evidence that *Bodianus frenchii* is a monandric protogynous hermaphrodite.
Spawning season and reproductive investment

- Spawning season on both coasts is from October to February
- Gonad weights during spawning season far greater on south than west coast
- Reflected in far greater batch and potential annual fecundities
Main findings for *Bodianus frenchii*

- Exceptional longevity. Max. age = 78 years
- Maturity is related more to length than age
- Sex change is related more to age than length
- Monandric protandrous hermaphrodite
- Regional differences in
  - Growth
  - Length and age at maturity and sex change
  - Fecundity
- South coast may provide better environment for growth and reproduction
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