



FISHERIES FACT SHEET

BALDCHIN GROPER



Baldchin groper
Choerodon rubescens

Unusual name, unusual nature

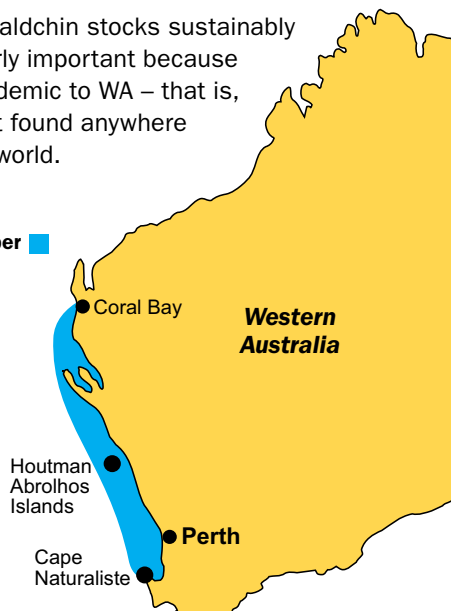
Baldchin groper, affectionately known as ‘baldies’, are greatly prized for their high-quality white flesh. Found only in WA, they are powerful swimmers and quite capable of breaking a fishing line as they dive for cover among rocks and coral.

Exclusive to WA waters

Baldchin are only found in WA waters between Coral Bay and Cape Naturaliste. They are most abundant at the Houtman Abrolhos Islands, 60 kilometres west of Geraldton.

Managing baldchin stocks sustainably is particularly important because they are endemic to WA – that is, they are not found anywhere else in the world.

Range of baldchin groper



A long life but a slow-growing one

Baldchin can live for 25 years. However, like many bottom-dwelling fish, they are slow-growing. For example, it takes them around five to seven years to reach 40 centimetres in length. Because of their slow growth rate, baldchin groper populations are likely to take a long time to recover from sustained overfishing.

What’s in a name?

Baldchin groper are members of the Labridae or wrasse family. With protruding tusk-like teeth in both jaws, they are also one of the largest species of tuskfish, reaching about 70 centimetres in length and seven kilograms in weight – about as heavy as a small dog!

Baldchin can be identified by the white patch on their pectoral fin and their white chin, giving this species its common name. Their body colour is quite variable, ranging from yellowish-brown for juveniles to pinkish-grey and even greenish-blue for large males.

i Wrasse are the second largest family of marine fishes – only the goby family has more species.

Reef-lovers

Baldchin live on the continental shelf, mostly on reefs less than 100 metres deep. They are carnivores and feed mostly on echinoderms, molluscs and crustaceans. Juvenile baldchin are often found in shallow weedy areas near reef.



Gender-benders

It may sound strange to us but, as with most wrasses, baldchin groper begin adult life as females and later turn into males!

Some time after female baldchin have reached maturity – which usually happens once they are around two to three years' old – they change sex to male.

The scientific term for this is 'functional protogynous hermaphroditism'. Another term for this reproductive behaviour is 'monandric' – that is, a specific type of

protogynous hermaphrodite that will first become sexually mature as a female before developing into a male.

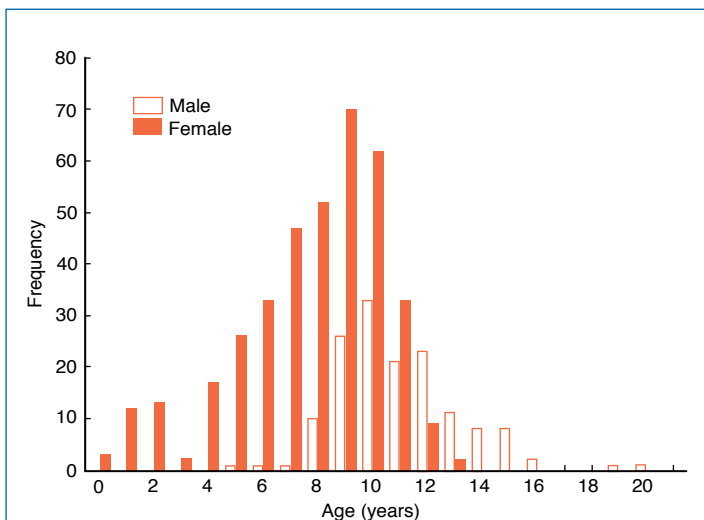
This fascinating but complex life cycle is very important for managing baldchin stocks but there is a lot that we still do not know about it. For example, researchers still don't know for sure what factors trigger female baldchin to change sex to male.

A study of a related tropical fish, the Venus tuskfish (*Choerodon venustus*), found that sex change occurred at a smaller size in heavily-fished populations than in moderately-fished populations. Researchers concluded that the trigger for female-to-male sex change in that species was the absence or low number of males in the population. More research is required to find out if this type of social trigger causes baldchin groper to change sex.

Female baldchin have been identified as old as 13 years and males as young as five years. However, it is thought that most baldchin groper develop into males at about the age when their growth rate slows down – between eight and 12 years' old.

i Researchers have suggested that if only large male baldies are caught by fishers and removed from the population there may be a shortage of males – and therefore sperm – for reproduction.

Another reason why it is a good idea to preserve large baldchin is that the large females are thought to produce more eggs than smaller ones – so keeping them alive helps keep the stock sustainable.



Age-frequency distributions for female and male baldchin groper from the Abrolhos Islands.

Spawning in groups – a risky time

Baldchin groper usually mature as females at about two to three years of age and 27 centimetres in length. They then produce eggs for a number of years before changing sex to male at around eight to 12 years of age and 48 to 55 centimetres long.

While usually solitary or inclined to reside in small groups, baldchin have occasionally been observed to 'aggregate' or gather in large groups of up to one hundred fish to spawn. At these times, they may be vulnerable to high levels of fishing.

At the Abrolhos Islands, spawning usually occurs from early spring to mid-summer with the peak period being November to early January.

It is thought that female baldchin are serial spawners, releasing eggs in a series of batches over one breeding season.

Bottom-dwellers that prefer to stay home

Baldchin are 'sedentary' – which means they may not travel far from home. This characteristic can make it easy for both recreational and commercial fishers to locate them and using GPS (global positioning system), record the spot and return another time.

They are also 'demersal' or bottom-dwelling fish and as is the case for some other demersal fish, they are extremely susceptible to barotrauma if caught in water of as little as 10 metres depth and dragged rapidly to the surface.

Barotrauma is the expansion of gases in the fish's body caused by rapid changes in pressure, similar to 'the bends' in humans. The most obvious symptoms include a bloated stomach, bulging eyes and the stomach pushed out through the mouth or gills.

The mortality or death rate of undersize and unwanted baldchin groper that are returned to the water after capture is thought to be very high, even if captured in relatively shallow water.

Indicator species

A special feature of WA's marine life is its rich biodiversity, or wide variety of species. For example, more than 600 fish species have been identified on the west coast between Kalbarri and Augusta, of which commercial and recreational line fishers take about 100. Of these, the most sought after demersal fishes are baldchin groper, dhufish, pink snapper, redthroat emperor and bight redfish, with smaller catches taken of breaksea cod and spangled emperor.

Because of the large range of demersal fish species, it is difficult for researchers to monitor in detail what is happening to each and every one. Therefore, the Department of Fisheries selects the longer-lived and more vulnerable fish species, such as baldchin groper, to act as indicators of what is happening among demersal species and so ensure that populations remain sustainable.



Baldchin groper, pink snapper and dhufish belong to the biological class Actinopterygii, or ray-finned, bony fish. Bony fish have a hard skeleton, a swim bladder and scales. These fish are distinct from the class Elasmobranchii, which includes sharks and rays.

Fishing pressure and fishy science

The level of fishing activity by WA's recreational and commercial fishers has grown along with the development and spread of fishing technology. In particular, widespread ownership of GPS means many fishers can re-locate areas where they caught high numbers of fish such as baldchin on past fishing trips.

Researchers use two main methods to work out whether fishing pressure is having a negative effect on baldchin groper stocks. The first includes analysing historical and current data. Catches (the number of fish caught) must be considered in the context of how many people are fishing and how many days they are going out fishing (called 'effort'). 'Catch rates' refer to data about both catch and effort combined – that is, the amount of fish caught in relation to fishing effort.

The second type of analysis used by researchers draws on knowledge about a species' growth rate and life cycle, and

compares this to evidence about the age structure of the population being fished.

Important signals that a population of fish is experiencing too much fishing pressure may include a decrease in the maximum age of fish caught or a decrease in the proportion of older fish caught.

If most of the mature fish are removed from a population this may affect the ability of that population to reproduce, leading to smaller and smaller numbers of juveniles in each succeeding generation.

In the case of baldchin groper, researchers think that 'recruitment' – in other words, the addition of young or legal size fish to the population – will also decline if heavy fishing causes a shortage of male baldchin.

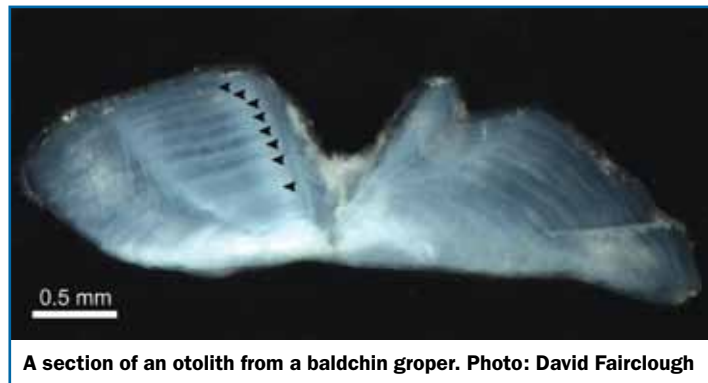
Ear bones – what tales they tell

Working out the age of sampled baldchin helps researchers understand the 'age structure' of a baldchin groper population – in other words, how many fish there are of different ages – as a way to monitor the health of baldchin stocks.

The ear bones of fish, called otoliths, contain a detailed record of their age. Each year as a fish grows, tiny bands of calcified material are laid down in the bone, similar to growth rings in a tree. When growth is faster, translucent or clear bands are laid down. When growth is slower, the bands are milky or opaque. Research has shown that in baldchin at the Abrolhos Islands, milky or opaque bands are laid down during spring and summer months.

Researchers extract the otoliths and cut thin sections from them using a high-precision saw. The bands are counted under a microscope – one opaque band for each year – to work out the age of the fish.

Researchers can also find out about the environmental conditions in which the fish lived – and therefore where it may have spent major parts of its life – by chemically analysing the otoliths.



References

Websites:

Department of Fisheries,
Western Australia:
www.fish.wa.gov.au

Department of Sustainability,
Environment, Water, Population
and Communities:
www.environment.gov.au

Commonwealth Scientific and
Industrial Research Organisation:
www.csiro.au

Fisheries Research and
Development Corporation:
www.frdc.com.au

Australian Fisheries
Management Authority:
www.afma.gov.au

Books and papers:

Allen, G. R. 2002. **Marine Fishes of Tropical Australia and South-East Asia. A Field Guide for Anglers and Divers.**

Hutchins, B. & Swainston, R. 1986. **Sea Fishes of Southern Australia.**

Hutchins, B. & Thompson, M. 1995. **The Marine and Estuarine Fishes of South-western Australia. A Field Guide for Anglers and Divers.**

Nardi, K., Jones, G.P., Moran, M.J. & Cheng, Y.W. 2004. **'Contrasting effects of marine protected areas on the abundance of two exploited reef fishes at the sub-tropical Houtman Abrolhos Islands, Western Australia.'**

Nardi, K, Newman, S.J., Moran, M.J. & Jones, G.P. 2006. **'Vital demographic statistics and management of the baldchin groper (Choerodon rubescens) from the Houtman Abrolhos Islands'**

Yearsley, G.K., Last, P.R. & R.D. Ward, R.D. 1999. **Australian Seafood Handbook, identification guide to domestic species.**

Fairclough, D.V. 2005. **'The biology of four tuskfish species (Choerodon: Labridae) in Western Australia.'** PhD dissertation, Murdoch University.

Glossary

Abundance

Number of fish in a stock or population

Age structure

The number of fish of different ages within a population

Aggregation

A gathering of fish in one area, usually during spawning

Barotrauma

Expansion of gases in the fish's body due to a decrease in pressure, similar to 'the bends' in humans

Biodiversity

Number and variety of life forms, including different species, the genes they contain and the ecosystems they form

Catch rate

The amount of fish caught in relation to fishing effort

Demersal

Bottom-dwelling, or living near the seabed

Effort

The amount of time spent fishing by a given group of fishers

Endemic

Restricted to, or only found in, one place

Maturity

Stage at which a fish can reproduce or breed

Monandric

Sex change occurs after female sexual maturity is reached

Mortality

Frequency of death

Otolith

Fish ear bone

Protogynous hermaphrodite

Female to male sex change

Recruitment

Addition of fish to a stock or population as a result of reproduction, migration or growth to legal size

Sedentary

Non-migratory, or tending to stay in one location

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FURTHER INFORMATION

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