Performance and contribution to commercial catches and egg production by restocked *Acanthopagrus butcheri* (Sparidae) in the Blackwood River Estuary

Cottingham, A.¹, Hall, N.G¹, Jenkins, G.I.², Williams, J.¹, Potter, I.C¹.

1. Centre for Fish and Fisheries, Murdoch University, Murdoch, Western Australia
2. Australian Centre for Applied Aquaculture Research, Challenger Institute of Technology, Fremantle, Western Australia

a.cottingham@murdoch.edu.au

### Background and Aims

As several stocks of Black Bream in south-western Australia had become depleted, a restocking programme was initiated to determine whether restocking could be used to replenish depleted populations of this solely estuarine sparid.

### Culturing and marking of juveniles

56 female and 50 male Black Bream were collected from the Blackwood River Estuary and used as brood stock to culture a total of 220,000 juveniles in the springs of 2001 and 2002.

The otoliths of cultured Black Bream were stained with alizarin complexone. 70,000 juveniles were released in the winter of 2002, at 7 m old, and 150,000 in the summer of 2003, at 4 m old.

The alizarin complexone stain still remained clearly visible in the primordium of the otolith after 12 years thus enabling cultured fish to be easily distinguishable from its wild stock.

### Biology of cultured and wild Black Bream

Samples of Black Bream were subsequently collected by independent sampling and from the sole commercial gill net fisher in this estuary over the next 12 years.

Only 6% of cultured fish belonged to the 2001 year class which were released in the winter of 2002.

The growth of cultured Black Bream was only slightly inferior to its wild stock.

The maturity schedules of cultured Black Bream likewise only differed slightly from its wild stock.

### Contribution to commercial catches

The contribution of the main year class (2002) of cultured Black Bream to the commercial fishery (black arrows) rose from negligible amounts in 2005, when they were 2 y old, to 32% in 2006 and to 74% in 2010.

Between 2005 and 2010 the most abundant cohort of wild fish belonged to the 1999 year class (grey arrows).

In 2012 a strong new cohort, representing the 2008 year class dominated the commercial catches in 2013 and 2014, when they were 4 and 5 y old, respectively.

Commercial catch data indicates that recruitment of Black Bream in this estuary is episodic and was negligible between 1999 and 2008.

### Contribution to egg production

Many of the mature Black Bream in the estuary in 2008 were cultured fish. Thus, the 2008 cohort is likely to be derived, at least in part, from cultured fish.

On the basis of the length-fecundity relationship of Black Bream, and the lengths and numbers of females in each year class, the contribution to egg production by restocked fish was 54% in 2007 and 55% in 2009.

### Conclusions

Cultured Black Bream performed almost as well as its wild stock, made a substantial contribution to commercial catches and contributed to future generations of Black Bream.

The results of this study demonstrate that restocking can be used to replenish depleted finfish stocks in an estuary.

We thank: The commercial fisher Trevor Price for providing samples and many staff and students at Murdoch University and Challenger Institute of Technology.