

## **QUEENSCLIFF SCIENTISTS ASSIST WITH PATAGONIAN TOOTHFISH RESEARCH**

Most Australians know little about the Patagonian toothfish, except that it is incredibly valuable, fetching up to US\$1000 per fish, and it is the subject of continuing illegal fishing activity by “pirate” fishing vessels in Australian waters.

The Australian toothfish fishery was established around Macquarie Island in 1994. Important research is being undertaken around Australia to gain an understanding of the biology, distribution, movement and abundance of toothfish. This research will help to ensure that this incredibly valuable, developing fishery is sustainable and that it does not threaten the integrity of the surrounding ecosystem.

To assist in gaining an understanding of the age and growth of this fish, scientists at Queenscliff’s Marine and Freshwater Resources Institute (MAFRI) are involved in ageing approximately 500 to 1000 Patagonian toothfish each year.

Otoliths, or earbones, from the Patagonian toothfish are sent to MAFRI’s Central Ageing Facility (the CAF) each year. Most of the otolith samples are collected by the Australian Antarctic Division (AAD) in the fishing grounds around Macquarie Island and Heard Island, although the CAF has also aged toothfish samples from the Falkland Islands and South Georgia

Initial work showed that the Patagonian toothfish was a relatively difficult fish to age, as the growth increments or rings on their otoliths were difficult to interpret. In order to verify the growth increments, the AAD tagged and released toothfish after injecting them with the harmless bone marking dye, strontium chloride. This dye leaves a mark on the otolith that is visible when viewed under a scanning electron microscope (SEM) fitted with a backscatter electron detector.

When commercial fishers recaptured these tagged fish, the otoliths were sent to the CAF at MAFRI for analysis. It was found that the time at liberty corresponded with the number of growth rings observed after the strontium mark on the otolith. This indicated that growth rings on the otoliths could be used as a reliable method to age toothfish.

To date, the CAF has aged over 5000 toothfish. The oldest toothfish aged was 48 years old, however over the last few years fish over 30 years old have not been common. Research has shown that toothfish grow slowly, reaching over 2 metres in length and over 100 kg in weight. They also take a long time to reach sexual maturity – not breeding until at least 7-10 years old.

This combination of longevity, slow growth and late sexual maturity make toothfish vulnerable to overfishing. As such, there are real concerns about the impact of high levels of illegal fishing on the toothfish stocks. Research such as that being undertaken by the CAF at MAFRI is therefore critical in helping scientists understand more about this vulnerable fish and the effects that fishing pressure may have on it.