

A day in the life of...

Jan St Quintin and Lee Higgins, osteo-chronologists

By Ben Carlish. Photos: Sandy Clarke

In a laboratory tucked away at the Department of Fisheries' Hillarys Boat Harbour base, two women wearing white lab coats quietly go about their business, which is effectively helping to track the abundance the State's fish stocks.

Armed with diamond-cutters, microscopes and resin, their work is vital in giving the Department of Fisheries a comprehensive understanding of the age composition of some of Western Australia's most important finfish species.

This information is an essential piece of the jigsaw for scientists in providing advice to fisheries managers, having determined the status of our fish stocks, to ensure their sustainability. Their work is at the very

heart of the Department of Fisheries' aim of ensuring fish for the future.

But it's the kind of work that two of the long-standing so-called 'osteo-chronologists', Jan St Quintin and Lee Higgins, rarely talk about to other people in detail at parties.

"You tell them that you determine the age of fish by counting the rings in the ear-bones of a fish and they generally say, 'WHAT?'" laughs Jan.

"I just tell them I'm a lab assistant and leave it at that! It's too hard otherwise," confesses Lee.

While their work may require precision, attention to detail and the wearing of white coats as per your average laboratory

assistant, it is far from average lab work that they are doing.

As Jan's explanation suggests, their work revolves around 'otoliths' – the tiny ear bones, usually no bigger than a pinkie fingernail, located in a fish's head. These bones are critical for hearing, balance and perception of depth for fish. The otoliths are taken from fish frames (or skeletons) donated to the Department by recreational and commercial fishers.

The otoliths are then given to Lee and Jan, who mix up a resin in which to set the otoliths. This protects the delicate bones from chipping and helps keep them stable before they are cut with the diamond-cutter into super-thin slices – less than a

Focused on sustainability – Lee (left) and Jan put an otolith sample under the microscope.





The bare bones – dhufish otoliths in all their delicate beauty.



Cutting edge – Jan operates the diamond cutter to prepare the otolith slice.

third of a millimetre thick. This requires a deft hand and an experienced eye – and in Jan and Lee’s case, there are no more experienced eyes than theirs. Together they share more than 35 years of experience in preparing otolith sections for ageing.

After the otoliths are cut, they are aged by placing them under a microscope and projecting the image onto a computer screen.

“The otolith sections display growth rings like you see in the trunk of a tree,” explains Lee. “And from these, the scientists can determine the age of the fish, how they are growing and the health of a fish stock. It shows us the age structure and allows us to determine if too many older fish are being taken and if there’s enough juvenile fish coming through.”

Supervising Scientist (Finfish) Dr Brett Molony expands on the significance of Lee and Jan’s work.

“Age structures of fish populations (that is, how many fish of each age are in a population – a bit like a census for fish), size and age at maturity, and how long fish live, all provide useful information for fisheries management,” he says.

“This knowledge helps us determine if stocks are being fished sustainably and provides scientific advice to managers of vulnerable stocks.”

And while to some, their work may seem repetitive and laborious, Jan and Lee are happy in the knowledge that their work is pivotal in ensuring the sustainability of our prized fish populations.

Indeed, one of their proudest moments was when the results of their otolith preparation effectively sounded a clarion call to save the Shark Bay Pink Snapper Fishery back in the mid-1990s. Research by the Department of Fisheries confirmed that the populations of pink snapper in the Eastern Gulf were experiencing too much fishing effort and catch, and that the biomass was very low. That is to say, the stocks were being overfished and at risk of collapse.

The data collected from the otolith samples was the key to understanding the age structure of the snapper stocks and therefore the risks to sustainability of these important stocks. More than 3,000 otoliths from Shark Bay snapper were prepared for ageing by Jan and Lee in the year 2000 alone.

Having been able to build up a picture of the extent of the decline in the pink snapper populations, the Department of Fisheries was able to introduce a whole range of measures aimed at rejuvenating the pink snapper stocks, including the temporary closure of the Eastern Gulf fishery.

Happily, five years later, the fishery was re-opened after the Department was able to determine that pink snapper stocks had made a significant recovery. It was a close call, though, supported by the critical information made available to scientists through Lee and Jan’s work.

The information gained from the otolith sections was vital because in the instance of slow-growing demersal (bottom-dwelling) scalefish such as pink snapper, the size of a fish isn’t a good indicator of fish age. So, a 10 year old pink snapper may be the same size as a 25 year old fish of the same species. Ensuring that there are enough females across a range of ages for sufficient egg production to contribute to the next generation of fish is a key element in managing fish stocks.

And examining the otolith sections in this way is the only reliable way of ageing fish populations. In this sense, accurately counting the growth rings in a fish’s otolith section really is getting down to the bare bones of a fish stock’s sustainability. This simply could not happen without Jan and Lee’s tireless diligence.

“Some people might not see what we do as the most exciting work in the world, but it’s quite satisfying knowing we are doing our bit to help save fish stocks for the future,” says Lee.



Slice of life – an otolith bone section displays its intricate structure

“We get on really well and we’re a really good team,” adds Jan. “I think that makes all the difference. When you work with good people as we do, it makes the job really enjoyable. I don’t think we would have been here as long as we have, if we didn’t get on so well.”

Lee points out that it’s the kind of work, well suited to “maturer ladies”, as she puts it, as the activity does require a lot of patience and attention to detail. It’s also quite a resource-intensive job involving relatively long hours for the outcome and the materials themselves cost a fair amount

of money – for example, the diamond blades for cutting the otoliths alone cost \$800 a piece, although they do usually last for some considerable time.

The most precious ‘assets’ in the process, though, are without doubt Jan and Lee, whose skill and experience in this area make them unique in the State. The worry is who will replace them when they retire? Happily this won’t happen for a while yet, but it is going to be a tall order to replace these amiable and highly specialised ladies for the Department of Fisheries. However, encouragingly, the Department has taken on a new young recruit to ‘bone up’ on the finer points of otolith cutting.

It is particularly essential these skills be passed on because they are now playing a key role in determining the health of some of WA’s most iconic demersal scalefish species. They will no doubt continue to do so as fish like pink snapper, dhufish, baldchin groper and breaksea cod come under the research spotlight, with intense interest in the success of their recovery following the recent introduction of recreational fishing rule changes. Just don’t expect Jan or Lee to talk about it should you meet them at a party. ■



Frozen in time – Lee holds up an otolith set in a resin block.