Killer Tooth Ache

by Dr Ingrid N. Visser

One of the holy grails for divers is to meet animals underwater and perhaps whales and dolphins are at the pinnacle of the wish list of 'charismatic mega-fauna'. As a scientist I've been fortunate to spend time underwater with different species of cetaceans, the collective term for whales, dolphins and porpoises. My research specialty is orca (also known as killer whales) and as such I've had the chance to spend a lot of time with them in their ocean habitat. My studies focus on the foraging behaviour of orca, particularly around the New Zealand coastline where their main food is rays and sharks. I've documented hundreds of hunting events and recorded a range of prey species, some for as world-firsts for orca.

Watching any animal hunt is always fascinating but watching orca hunt adds a whole other level of impressive to the experience. One of the things that always strikes me is their impressive teeth – with between 48 to 52 massive and interlocking ivories, the mouth of an orca is something to behold. Despite these strong and pointed teeth the orca handle their prey with delicate aplomb, at times almost dissecting their dinner with surgical precision. And their meal can consist of a wide range of cold and warm blooded creatures, from squid to fishes, from birds such as penguins to those that can fly (who are often caught unawares and dragged underwater), from seals to dolphins and occasionally includes the large whales, which is where their common name is thought to come from in a transposition of whale killer to killer whale.

The author and a pod of Killer Whales. Still frame from footage shot by Steve Hathaway.

Based on the type of food they consume but also factoring in the way they catch that prey, each population of orca has a distinct culture. For instance, a 'fish eating' population might use a 'round-them-up-and-hit-them-with-your-tail' method or a 'grab-them-from-the-edge-of-the-school' method to take fish – each of these based around a unique cultre. A shark hunting population might use a 'karate-chopping' or a 'stealth-and-ram' method to debilitate a shark before consuming it. In combination with these foraging techniques, if you then add in the different types of social structures and the various vocal dialects that have been documented, the result is a species that, just like us,

Wild Orca in New Zealand with pristine teeth © Dr Ingrid N. Visser, Orca Research Trust

Dr John Jett, an ex-orca trainer, now professor and author says, "We investigated 29 orca owned by one company and held in the USA and Spain. Every whale had some form of damage to its teeth. We found that more than 65% possessed moderate to extreme tooth wear in their lower jaws, mostly as a result of chewing concrete and steel tank surfaces."

has localised and distinctive cultures. By observing orca around the world I've come to respect and understand just how complex these cultures are and how exceptional each and every orca is within its own culture and on a global scale.

Therefore, it came as a horrific blow to me when I saw orca in captivity for the first time. I had nearly completed my PhD studying the New Zealand orca and was attending the largest marine mammal conference in the world to present my results. The conference was held in Monaco and not too far away was Marineland Antibes, in France. I had heard that these places were horrible, I had seen dolphins in captivity and was far from impressed, but I had no idea of the extent of the tragic circumstances that orca were exposed to. With that first glimpse I became a staunch advocate to halt this barbaric exploitation of what I had always seen as a majestic and awe-inspiring animal. Fast forward nearly two decades and more than 20 scientific papers later and I'm now authoring reports and scientific studies exposing the degree to which the orca have been damaged by captivity.

My first comprehensive report focused on an orca called Morgan who was held in solitary confinement. Born in the wild, she had somehow suffered a bad turn of events and ended up emaciated and alone off the coast of the Netherlands. Under a 'rescue, rehabilitation and release' permit a Dutch dolphinarium captured her and restored her health. The story should have had a happy ending, but alas, Morgan was not sent home to her family, which had been identfiied, but rather she was transferred to Loro Parque, in Tenerife Island, Spain, so that she could be bred and used in circus-like shows. From the moment that she arrived she was attacked by the other orca, to the point where I documented over 350 bite marks on her skin. She began gnawing on the concrete as a way to project her stress and the boredom that comes from living in a barren blue cage. This self-harming resulted in her badly damaging her teeth. In

Wild Orca in New Zealand with pristine teeth © Dr Ingrid N. Visser, Orca Research Trust

Damaged orca teeth, chipped, broken, drilled and worn to the gums, USA

just four months they went from nearly pristine to permanently and irreparably damaged. After just a year they were chipped and broken. After a couple of years at least one tooth was completely fractured in half and a number were ground down to the gums. Yet during all of this time and amid repeated exposés, the facility continued to claim, despite the photographic evidence, that I was falsifying data and that there was nothing wrong with her teeth.

After a number of reports and with such data in hand for more than one orca, I reached out to ex-SeaWorld orca trainers Jeff Ventre and John Jett who had stared in the acclaimed documentary "Blackfish" and I proposed that we work together to compile a scientific paper which would use all the photographic evidence myself and my colleagues had collected over the years. We shook on it and that was the start of a research project which has now been published. Along the way we had added two more colleagues as co-authors; an expert on cetacean dentistry, Dr Carolina Loch and an investigative researcher, Jordan Waltz and we called in a suite of helpers who assisted with sorting the 1,000's of photographs I had on file.

Two years in the making, the research has been published as a 'peer-reviewed' scientific paper, meaning that other scientists have critiqued the work, and along with the editorial staff at the scientific journal 'Archives of Oral Biology', have found our work to be of high standard and worthy of publishing in this prestigious bulletin.

A far cry from the spectacular teeth of wild orca, the paper has found

Wild Orca hunting. © Dr Ingrid N. Visser, Orca Research Trust

Close-up, damaged orca teeth, showing chips, cracks, bore holes and wear, Spain.

a series of wounds and traumas to the teeth of the captive orca that is nothing short of disturbing and of grave concern.

All of the orca investigated for the study (29 animals) are owned by one company. They keep 23 of the animals in the USA (in three commercial entertainment theme parks – one each in Florida, Texas and California) and another six orca in an 'offshore breeding facility' (another commercial theme park) the same one in Spain where Morgan was being held.

Our results reflected what all the co-authors knew, and clearly what the captive orca industry knew, but were either ashamed or embarrassed to report on; All the orca in the study had some form of tooth damage, with 79% having "moderate" "major" or "extreme" wear to the teeth on the mandibles. That damage was so debilitating to the teeth that more than 61% of teeth #2 and #3, and 47% of tooth #4, exhibited evidence of having undergone the 'modified pulpotomy' (a drilling procedure).

All in all the study is just further proof that orca (and their kin) shouldn't be kept in captivity – and yet it is clear that the captivity industry has known about issues like this for decades. Now, armed with this growing body of evidence it is up to us, as members of society who care about how animals of the ocean are treated, voice our opinions and call for these animals to be retired with the dignity and respect they deserve. As we are privileged to meet these animals in the wild, I hope you would agree that it is our moral and ethical obligation to speak out for those held in tanks.

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