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PHOTOS | Greenland sharks may live 400 years, scientists say

Creature that dwells in Arctic Ocean and deep sea may live up to 400 years

By Sima Sahar Zerehi, CBC News Posted: Aug 11, 2016 12:00 PM CT | Last Updated: Aug 11, 2016 12:03 PM CT



The study examined 28 female Greenland sharks caught as bycatch. (Submitted by Julius Nielsen)

About The Author



Sima Sahar Zerehi

Sima Sahar Zerehi is a reporter with CBC North. She started her career in journalism with the ethnic press working for a Canadian-based Farsi language newspaper. Her CBC journey began as a regular commentator with CBC radio's Metro Morning. Since then she's worked with CBC in Montreal, Toronto and now Iqaluit.

Step aside Galapagos tortoises, the Greenland shark may be the longest-living vertebrate on Earth with a 400-year lifespan, a new study suggests.

The study published in the journal Science examined 28 females caught as bycatch and determined that Greenland sharks have an average lifespan of 272 to 512 years, with their most likely lifespan being 390 years.

The two largest sharks in the study were estimated to be around 335 to 392 years old.

Experts believe that Galapagos tortoises have a lifespan of about 250 years. Bowhead whales can live up to 200 years, and some fish live to 150.

"It's really fun to dig in to a very fundamental question about such a big animal," said Julius Nielsen, one of the study's authors, and a PhD candidate from the University of Copenhagen in Denmark.

"This thing with the age just seemed to be like the absolute top mystery."

Nielsen said that he had suspicions about the longevity of Greenland sharks, but he never suspected that they could live so long. He said one Greenland shark caught and measured by researchers and then tagged and released was caught again 16 years later and had only grown eight centimetres.

"So people have always expected Greenland sharks to be very slow growing," said Nielsen.

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The study determined that Greenland sharks have an average lifespan of 272 to 512 years. (Submitted by Julius Nielsen)

How do you ask a shark its age?

The problem Nielsen faced was figuring out a way to measure the age of the scarcely studied Arctic creatures.

"The thing about Greenland sharks is that they cannot be age-determined by any conventional methods," he said.

The age of most fish, such as salmon or trout, is determined by analyzing calcified tissue, but Greenland sharks don't have conventional tissues such as otoliths, or ear stones.

"It's just so soft and it doesn't have any of these hard tissues, so we cannot count any growth layers in any parts of the body," he said.

Nielsen and his team then tried radiocarbon dating techniques on the sharks' eye lenses, a technique that has been used on other difficult-to-age vertebrates such as the bowhead whale.

That's how they determined that Greenland sharks have ages well over 200 years and only reach sexual maturity between the ages of 130 and 170.



'It's really fun to dig in to a very fundamental question about such a big animal,' says Julius Nielsen, one of the study's authors. (Submitted by Julius Nielsen)

Secret to their long life

It's still a mystery why Greenland sharks live such long lives, said Nielsen.

Part of the answer may have to do with the fact that they are cold-blooded animals that prefer to live in cold climates such as the Arctic Ocean and the deep sea.

"If you have a very low body temperature, you are also expected to have a very slow metabolism," said Nielsen.

"That must be a part of the explanation on how they can get this old. But I'm sure that there are other things also, but we haven't identified that

1:31

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yet."

Deep waters

Very little is known about the general biology of Greenland sharks.

"It's a super mysterious animal," said Nielsen.

Greenland sharks are found throughout the Arctic, but they are also found in deep, cold water elsewhere in the world. There have been sightings in the Canary Islands, and even in the Gulf of Mexico.

They are one of the biggest carnivorous sharks in the world and grow to reach lengths of 400 to 500 cm. The two largest and oldest sharks in Nielsen's study, were at 493 cm and 502 cm in length, and were estimated to be more than 300 years old.

The sharks are typically grey in colour, but can also be black, Nielsen said on one occasion he encountered a Greenland shark that was spotted all over.

But their distinguishing physical feature is their ancient look.

"They look like an old animal," he said.

"When you look at them, you can see that it is something that has been down there for quite a while."

The sharks are also known for having a parasite in their eye, which looks like a white worm.



Greenland sharks are found throughout the Arctic, but they are just as much a deep sea shark. (Submitted by Julius Nielsen)

Ambush predators

Their diet consists of Atlantic cod, Greenland halibut or turbot and seal. It is very common to find parts of seals or an entire seal in their stomach, said Nielsen.

Their sluggish demeanour had misled scientists about their true nature. In the past it was believed that they were scavengers.

"Now more and more scientists believe that they might be ambush predators — top predators in the ecosystem — and may have a more important function in the ecosystem," said Nielsen.

He added these sharks were previously overlooked with very few scientists studying them, as it's "difficult to get money to do research on a species that has no economic value."

He said more research is needed to implement any conservation or management plans, particularly in light of climate change and increased fishing and exploration in the Arctic.

Nielsen said he's interested in discovering whether there are different kinds of Greenland sharks in various regions and in learning more about their breeding grounds.

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