

Salmon spawning a heart-stopping moment

By MASAFUMI KAMIMURA

The Asahi Shimbun

NEMURO, Hokkaido—Researchers here have confirmed an unusual phenomenon first observed in spawning salmon 25 years ago.

The hearts of male and female salmon actually stop beating at the climactic moment in which they lay and fertilize their eggs.

Hokkaido researchers confirmed it with data from 14 chum salmon at the Shibetsu Salmon Museum in Shibetsu, near here in eastern Hokkaido.

In an experiment last November, the heartbeats of spawning salmon halted for six to seven seconds while the female released eggs and the male fertilized them.

The phenomenon was first reported in a 1983 article, but that data was from only one pair of salmon.

The latest research from

several pairs confirmed the action as a physiological response common to chum salmon, the researchers say. It will be released at a U.S. symposium in September.

The joint study was done by Yuya Makiguchi, a doctoral student at Hokkaido University's Graduate School of Environmental Science, Masaki Ichimura, a curator at the salmon museum, and other researchers. The test was conducted in the museum's large fishway tank connected to the nearby Shibetsugawa river.

The researchers captured and anesthetized 20 salmon that had swum upriver from the Nemuro Strait.

Electrodes were implanted near their hearts and tiny heartbeat recorders attached to their backs. The fish were then returned to the tank, where their spawning was recorded on video.

Heartbeat data was suc-

cessfully taken from five of the males and nine of the females, and compared with the video footage.

The data showed the heartbeats of both the male and female fish stopped for six to seven seconds during the act of spawning. Chum salmon usually have a heartbeat of 80 to 90 beats per minute.

According to Makiguchi, their heartbeats had stopped for the same amount of time that would usually cover about 10 heartbeats.

"The autonomous nerve system apparently stopped the heartbeat," he said.

"The heartbeat cessation was observed only during spawning," he added.

The 1983 article was written by Kazumasa Uematsu, a professor of fish neurobiology at Hiroshima University's Graduate School of Biosphere Science.

According to Uematsu's the-



YUYA MAKIGUCHI

A video capture shows a pair of chum salmon spawning at the Shibetsu Salmon Museum in Shibetsu, Hokkaido. Their hearts stopped beating just after their mouths opened, data showed.

ory, the phenomenon occurs because salmon must use the strength of their entire body when spawning.

Unlike sea bream or flounder, whose ovaries or testes contract during spawning, salmon apply so much mus-

cular strength while spawning that the blood capillaries in their entire bodies are nearly squashed.

"Perhaps they stop their heartbeat in order to lower the blood pressure (at that moment)," he explained.