

Zoologists: Sea snakes seek out freshwater to slake thirst

November 6 2008

Sea snakes may slither in saltwater, but they sip the sweet stuff. So concludes a University of Florida zoologist in a paper appearing this month in the online edition of the November/December issue of the journal *Physiological and Biochemical Zoology*.

Harvey Lillywhite says it has been the "long-standing dogma" that the roughly 60 species of venomous sea snakes worldwide satisfy their drinking needs by drinking seawater, with internal salt glands filtering and excreting the salt. Experiments with three species of captive sea kraits captured near Taiwan, however, found that the snakes refused to drink saltwater even if thirsty — and then would drink only freshwater or heavily diluted saltwater.

"Our experiments demonstrate they actually dehydrate in sea water, and they'll only drink freshwater, or highly diluted brackish water with small concentrations of saltwater — 10 to 20 percent," Lillywhite said.

Harold Heatwole, a professor of zoology at North Carolina State University and expert on sea snakes, termed Lillywhite's conclusion "a very significant finding."

"This result probably holds the key to understanding the geographic distribution of sea snakes," Heatwole said.

The research may help explain why sea snakes tend to have patchy distributions and are most common in regions with abundant rainfall,

Lillywhite said. Because global climate change tends to accentuate droughts in tropical regions, the findings also suggest that at least some species of sea snakes could be threatened now or in the future, he added.

"There may be places where sea snakes are barely getting enough water now," he said. "If the rainfall is reduced just a bit, they'll either die out or have to move."

Sea snakes are members of the elapid family of snakes that also includes cobras, mambas and coral snakes. They are thought to have originated as land-dwelling snakes that later evolved to live in oceans. Most spend all, or nearly all, of their lives in seawater, including giving birth to live young while swimming. A minority, including the kraits that Lillywhite studied, lay eggs and spend at least a small part of their lives on land.

In the lab studies, Lillywhite's team kept snakes caught in the wild near Orchid Island, Taiwan, away from freshwater for two weeks. At the end of that period, dimpling of the snakes' scales indicated they were dehydrated.

The researchers weighed the snakes, freed them in saltwater tanks for up to 20 hours, then weighed them again. None gained appreciably, indicating they didn't drink, despite their thirst. But when the researchers freed the snakes to swim in freshwater tanks, most immediately drank significant amounts. More experiments revealed the snakes would drink only freshwater or highly diluted saltwater.

The kraits may get their freshwater from springs or streams around Orchid Island — deed, the researchers observed far more sea snakes near these freshwater sources than in strictly marine sites, the paper says.

Lillywhite believes the sea snakes that spend their lives in the open ocean drink water from the "lens" of freshwater that sits atop saltwater during

and after rainfall, before the two have had a chance to mix. That would explain why some seawater lagoons, where the waters are calmer due to protection from reefs, are home to dense populations of sea snakes — the freshwater lens persists for longer periods before mixing into saltwater.

Rather than helping sea snakes gain water, the snakes' salt gland may help the snakes with ion balance — moving excess salts from the bloodstream, Lillywhite said.

Some sea snake species living in dry regions may already be suffering as a result of climate change. Lillywhite said a colleague in Australia, which is in the midst of a historic drought, has observed declines and possible extinctions in some species at Ashmore Reef, home to the most diverse and abundant population of sea snakes in the world.

"We are trying to look at rainfall in that region and see if there is a correlation," Lillywhite said.

He added that his findings also raise questions about the accepted wisdom that other marine reptiles, including sea turtles, satisfy their freshwater needs by drinking saltwater.

Source: University of Florida

Citation: Zoologists: Sea snakes seek out freshwater to slake thirst (2008, November 6) retrieved 23 April 2024 from <https://phys.org/news/2008-11-zoologists-sea-snakes-freshwater-slake.html>

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