Turtle hatchlings lend each other a flipper to save energy

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A study has shown that turtle hatchlings lend each other a flipper digging out of the sand to save energy. Credit: Banco de Imagem Projeto Tamar/Flickr, CC BY-SA

Newborn sea turtles do not have it easy. Hatchlings take nearly eight days to dig through 40 centimetres of sand to emerge from their nests, and then need extra energy to traverse a long stretch of beach to the ocean.

However, new research suggests turtle hatchlings work together with clutch mates to escape their underground nests – and the more they team up, the less energy they waste.

Researchers from the University of Queensland and the Universiti Malaysia Terengganu set out to measure the amount of energy used by green sea turtle hatchlings to burrow from the nest to the beach surface.

Experiments were conducted in specially designed egg chambers that carefully mimicked natural beach-hatching conditions - down to the grain quality of the sand. The researchers observed that the combined digging of hatchlings significantly reduced individual energy consumption.

The findings, published today in the *Journal of Experimental Biology*, may influence sea turtle conservation efforts worldwide, especially the practice of splitting egg clutches.

All the eggs in one basket

Scientists have long known that bird flocks and schools of fish work together to save energy when moving around.

Researchers first suggested that turtles gave each other a hand as newborns more than 50 years ago. They called it 'social facilitation' but had limited empirical evidence on the question.

"No investigation has been done to explore how 'social facilitation' might influence the energy spent by individual hatchlings escaping the nest," said Mohd Uzair Rusli, lead researcher on the project.

The experiments conducted by Rusli and colleagues showed that large groups of green sea turtle hatchlings used considerably less energy than

smaller clutches to escape the nest.

"In a big group of more than 60 hatchlings, hatchlings only used 10% of their reserve energy to escape the nest as compared to the smaller group, which used more than half of their reserve energy."

The findings may help us better understand the "nest escape" process for other underground nesting reptiles like lizards, snakes and crocodiles, he said.

The research was conducted in two sites with eggs collected from Chagar Hutang Beach, Redang Island, and Heron Island in Queensland. Special chambers constructed of PVC were kept at a constant temperature. All the sand used was sieved to ensure it was a medium sand grade. Pipping eggs (eggs where the hatchling has "pipped" their shell with their egg tooth prior to hatching) were randomly selected and buried in the chambers under a column of beach sand in groups of between 10 and 60 eggs. Researchers were able to determine when hatching occurred and measured energy expended by the hatchlings by calculating oxygen consumption.

Rusli said the study findings were crucial for sea turtle conservation worldwide and may encourage a reconsideration of a common conservation strategy of splitting natural clutches into smaller clutches for relocation.

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