

Ecotourism is causing northern Bahamian rock iguanas a sugar high

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As the old English saying goes "a little of what you fancy does you good," but the current human type 2 diabetes epidemic suggests that you can have too much of a good thing.

"A prolonged high [sugar](#) diet can 'exhaust' the ability to regulate [blood glucose](#)," says Susannah French from Utah State University, U.S.. And the human obsession with feeding wildlife may be placing other species at risk from unbalanced diets: "Catalina Monzon-Arguello and colleagues discovered in 2018 that juvenile green sea turtles in the Canary Islands have high fat and cholesterol levels in their blood as a result of being fed by tourists," says French.

Northern Bahamian rock iguanas on the Exuma Islands are also familiar with sightseers that ply them with grapes. The question was how much of an impact the sugar-charged diet is having on the reptiles' health? French, Dale Denardo (Arizona State University, U.S.), Northern Bahamian rock Iguana expert Charles Knapp (John G. Shedd Aquarium, U.S.) and colleagues have published their discovery that ecotourists are giving the iguanas high blood sugar in *Journal of Experimental Biology*.

Denardo and French needed to know how captive iguanas would respond to a [high sugar diet](#). "We chose to study the more common green iguana in the lab, because rock iguanas are critically endangered," says French, who supplemented the youngsters' usual "tortoise diet" and greens meals with either a high (5g/kg) or low (2.5g/kg) glucose drink. "The low dose provides glucose in an amount similar to that found in consumed grapes," says Denardo. Then, after 17 days, he gave each iguana an intermediate strength glucose drink (3.75g/kg) and monitored the animals' blood glucose over the following 2 days. The reptiles' glucose levels peaked 3 hours after consuming the sugar; however, the iguanas that had been fed the high glucose diet had the most difficulty regulating their blood sugar levels, reaching ~520mg/dl, in contrast to iguanas that had been fed the tortoise diet and greens alone, whose levels peaked at only ~420mg/dl. A high glucose diet seemed to impact the captive iguanas' ability to regulate their blood glucose levels after a meal. But what about the wild iguanas on the Exuma Islands?

French, Denardo, Knapp and colleagues from various US institutions traveled to the remote islands on the Shedd Aquarium's research vessel, Coral Reef II. "When we pull up onto picturesque sandy beaches on the tourist islands, the sound of the boat motors draws the iguanas down, but landing on the islands where tourists do not travel requires carefully timing your jump from the boat," French recalls. Gently capturing 48 rock iguanas, 24 from islands frequented by tourists and 24 from islands that are too rugged for tourists to reach, the team fed each iguana a glucose drink and monitored their blood sugar responses for almost a day. The results were concerning. The iguanas from one island where they are fed frequently by tourists experienced the highest glucose peak ~570mg/dl after 5 hours, remaining high 8 hours later, although [grape](#)-fed iguanas from another island had a less extreme response (~505mg/dl after 5 hours). In contrast, the blood sugar of the iguanas from the islands that rarely see [tourists](#) was much lower (peaking at ~450mg/dl), rose at a slower rate and returned to normal more quickly.

Ecotourists feeding the wild iguanas on the Exuma Islands are definitely affecting the iguanas physically. Now, the question is whether they are also affecting the animals' health. "If these were humans, we would be talking about diabetes; however, it is not yet clear what the health implications are here. That is something we are continuing to work on," says French.

"The opportunity to develop extraordinary connections with wildlife through tourism can lead to compassion and conservation, but we need to work towards a future where animals and the livelihoods of people who rely on them are safeguarded," says Knapp. He adds, "While we continue to expand our understanding of how tourism affects these endangered iguanas, we hope that our research will guide science-based recommendations for sustainable wildlife activities."

More information: Glucose tolerance of iguanas is affected by high

sugar diets in the lab and supplemental feeding by ecotourists in the wild, *Journal of Experimental Biology* (2022). [DOI: 10.1242/jeb.243932](https://doi.org/10.1242/jeb.243932)

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