

# Feeding by tourists compromises health of already-endangered iguanas, study finds

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Feeding wildlife is an increasingly common tourist activity, but a new study published online today by the journal *Conservation Physiology* shows that already-imperilled iguanas are suffering further physiological problems as a result of being fed by tourists.

Charles Knapp, PhD, of the John G. Shedd Aquarium in Chicago and colleagues compared the differences in physiological values and endoparasitic infection rates between northern Bahamian rock iguanas inhabiting tourist-visited islands and those living on non-tourist-visited islands. They took blood and faecal samples from both male and female iguanas over two research trips in 2010 and 2012. The Bahamian rock iguana is among the world's most endangered lizards due to habitat loss, introduced mammals, illegal hunting, threats related to increased tourism, and smuggling for the illicit pet trade. They are listed on the IUCN Red List of Threatened Species.

While the two groups of iguanas did not differ in body condition, indicators for dietary nutrition differed. Both male and female iguanas from the islands frequently visited by tourists showed notably different levels of glucose, potassium, and uric acid. Male iguanas from the tourist areas differed in levels of calcium, cholesterol, cobalt, copper, magnesium, packed cell volume, selenium, and triglycide concentrations. Meanwhile, female iguanas from tourist areas differed significantly in ionized calcium. Among both males and females from tourist areas there was a 100% endoparasitic infection rate. Tourist-fed iguanas also displayed atypical loose faeces.

Dr Knapp says, "Both sexes on visited islands consume food distributed by tourists, although male iguanas are more aggressive when feeding and eat more provisioned food. Consequently, they may be more impacted by provisioning with unnatural foods, which could explain the greater suite of significant physiological differences in males between populations."

Iguanas on visited islands predominantly eat grapes that are provided by tour operators on a daily basis. The higher concentrations of glucose found in tourist-fed iguanas may be a result of being fed too many sugary fruits, such as grapes. An overabundance of grapes in those iguanas' diets could also explain the excessive diarrhoea observed during the study. Grapes are also inherently low in potassium, possessing 3-10 times less potassium than the most common plants occurring on the islands. Both male and female iguanas from the tourist areas showed notably lower levels of potassium than the non-visited iguanas.

The male tourist-fed iguanas have raised cholesterol concentrations, which may indicate the introduction of meat to their diet. Similarly, the higher uric acid levels in male and female iguanas could be the result of animal protein, such as ground beef, being fed to iguanas by tourists. Furthermore, food provisioning by tourists on beaches has encouraged the iguanas to spend disproportionate amounts of time foraging in the area, rather than further in the island, resulting in higher levels of marine life being ingested.

Dr Knapp says, "The biological effects of altered biochemical concentrations may not be manifested over a short time period, but could have deleterious effects on long-term fitness and population stability."

While the researchers acknowledge that increased population density as a result of tourist-feeding can be beneficial for endangered species, they warn that unnaturally high densities and excessive reliance on tourists for

food may prove problematic if food supplementation is discontinued for any reason. Further, plant community dynamics can be disrupted by changed feeding patterns in the iguanas.

Dr Knapp says, "The complete restriction of feeding by [tourists](#) may not be a realistic option. Instead, wildlife managers could approach manufacturers of pelleted iguana foods and request specially-formulated food to mitigate the impact of unhealthy food. Tour operators could offer or sell such pellets to their clients, which would provide a more nutritionally balanced diet and reduce non-selective ingestion of sand on wet fruit.

"We also endorse a broad education campaign and discourage references to feeding [iguanas](#) on advertisements. We urge serious discussions among wildlife managers and stakeholders to identify tactics that mitigate the impacts of current tourism practices without compromising an important economic activity."

**More information:** 'Physiological effects of tourism and associated food provisioning in an endangered iguana' by Charles R. Knapp, Kirsten N. Hines, Trevor T. Zachariah, Caro Perez-Heydrich, John B. Iverson, Sandra D. Buckner, Shelley C. Hallach, Christine R. Lattin, and Michael Romero, *Conservation Physiology*, [DOI: 10.1093/conphys/cot032](#)

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