

## INSIDE JEB

## Food helps thirsty lizards ward off dehydration effects



An adult male common lizard. Photo credit: Arnaud Badiane.

In the desert, you never know when you'll be able to find your next sip of clean water. This reality has caused many desert animals to evolve ways to conserve water or to get most of their water from what they eat. However, climate change is making water sources less reliable, even in areas that normally receive lots of rainfall. But the animals that live in these environments aren't used to being thirsty and haven't adapted to the dryness of the areas that they now inhabit. What do these animals do when they need a drink, but can't find any water? Chloé Chabaud, George Bruschi and Olivier Lourdaï from Université La Rochelle, France, along with Anouk Pellerin and Jean-François Le Galliard of Sorbonne Université, France, thought that common lizards (*Zootoca vivipara*) might be getting the water they need from the insects they eat even though other carnivorous reptiles – like snakes – don't get water from their food.

First, the team needed to find out what happens to the lizards when they are thirsty, so they slowly made the lizards

thirsty over the course of 10 days. After the 10 days was up, the reptiles had lost weight, had a thinner base to their tails (where they store fat) and had smaller thigh muscles, which are all indicators that the lizards were dehydrated. Some of the thirsty lizards were then given woodlice, spiders, or hydrated or thirsty crickets to feed on during the next 6 days of the experiment. After their meals, the lizards that ate crickets or spiders had lost less weight and the size of their thigh muscles and the base of their tails were larger than those of the lizards that ate woodlice or the lizards that ate nothing. Chabaud and colleagues believe this is because woodlice are generally difficult to digest as they have a hard exoskeleton and don't contain much water, whereas the crickets and spiders are easier for the small reptiles to digest and contain more water than the woodlice.

However, this still didn't tell the researchers whether the lizards were more hydrated than they were before they ate. So, to help answer this question, the team

tested the lizards' blood to see how much water it contained. Surprisingly, no matter which type of food they ate, the lizards had less water in their blood than the hydrated lizards. This suggested that the food alone was not providing the lizards with enough water to stay hydrated. The blood of the lizards that ate crickets and spiders also contained more digested fats, which may help keep their fat stores higher and help them survive the stresses of being thirsty for longer than other lizards. The researchers also found that the lizards given woodlice didn't eat as much as lizards that were fed spiders or crickets. This might be because they contain less water and have a harder skeleton, making them less nutritious overall. The team suggests that this is the reason that the woodlice-eating lizards weighed less, and had smaller muscles and tail bases than those fed more appetizing insects.

Although it doesn't seem that common lizards are able to use their food to gain the water they need while they are thirsty, food does seem to give the dehydrated lizards some benefits. Food keeps their energy reserves up and their muscles larger, which should allow them to move and find a more hospitable spot, perhaps with some drinking water. However, not all foods are created equal and not all lizards will be able to get the high-quality foods they need to stave off dehydration.

10.1242/jeb.246568

**Chabaud, C., Bruschi, G. A., Pellerin, A., Lourdaï, O. and Le Galliard, J.-F. (2023).** Prey consumption does not restore hydration state but mitigates the energetic costs of water deprivation in an insectivorous lizard. *J. Exp. Biol.* **226**, jeb246129. doi:10.1242/jeb.246129

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