

INSIDE JEB

Scales save bearded dragons from dehydration



A silkback bearded dragon that lacks scales. Photo credit: Nick Sakich.

What's the first thing that pops into your mind when someone says 'reptile'? Their beady eyes?; their splay-legged posture?; their cold-blooded nature? Not for Nick Sakich from Brock University, Canada. For him, the reptiles' defining feature is their scales. 'People have speculated for decades about what benefit scales might give reptiles', says Sakich. Scientists had thought the keratin-packed structures might help the animals retain water, but doubt was cast on this belief in the 1970s, when three rare partially scaled snakes were found in the wild. The animals lost water at roughly the same rate as snakes with a full set of scales. However, with his finger on the pet trade pulse, Sakich knew that enthusiasts had bred scaleless bearded dragons and his PI, Glenn Tattersall, had encountered the scale-free reptiles – known as silkbacks – independently at a show, learning that the lizards require a lot of water. So, when Sakich joined Tattersall's lab, the scene was set for the reptile fans to tackle whether scales really prevent reptiles from drying out.

Obtaining 6 silkback youngsters and 12 partially scaled 'leatherback' bearded dragons from hobby breeders, the duo set up a chamber to record how much water the animals lost while sitting at 35°C for 3 h. It quickly became clear that the animals without scales lost water much faster than normal bearded dragons. 'You could see this just by watching the lines tracking across the computer screen as you monitored the experiments', says Sakich. And, when he compared the water loss rates of the leatherbacks – which have less-prominent scales – with the water loss of normal and silkback bearded dragons, the leatherbacks also lost almost as much water as the silkbacks. In short, the scales on the skin of normal bearded dragons were reducing the amount of water that they lost, potentially protecting them from dehydration.

The next question that intrigued Sakich and Tattersall was whether the lizards' scaly hides would affect where the normal reptiles chose to hang out relative to their

bald and semi-bald cousins. 'Would an animal losing water faster decide to walk to a cooler area to reduce its rate of water loss?', wondered Sakich. To find out, he rigged up runways where one end was held at 45°C, while the cooler end was at 20°C, filming silkback, leatherback and normal bearded dragons as they moved to and fro until they found a temperature somewhere in-between where they were comfortable. But the four-lane temperature gradient device could only accommodate small lizards, placing considerable urgency on his schedule before the youngsters grew too large to fit in. 'The clock was ticking', he chuckles. However, when Sakich compared where the lizards settled on the temperature gradient, he found they mostly selected temperatures around 37.5°C. The silkbacks and leatherbacks were not choosing cooler locations to conserve water. 'Either they can't tell they're losing water faster or they made a strategic decision to prioritise warmth', says Sakich.

Having laid the scale conundrum to rest, Sakich is keen to find out how scale size and shape affect lizard water loss. And he is pleased that all of the lizards that participated have moved on to good homes. 'One was adopted by a Brock University staff member... and is quite the cricket glutton', Sakich laughs.

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