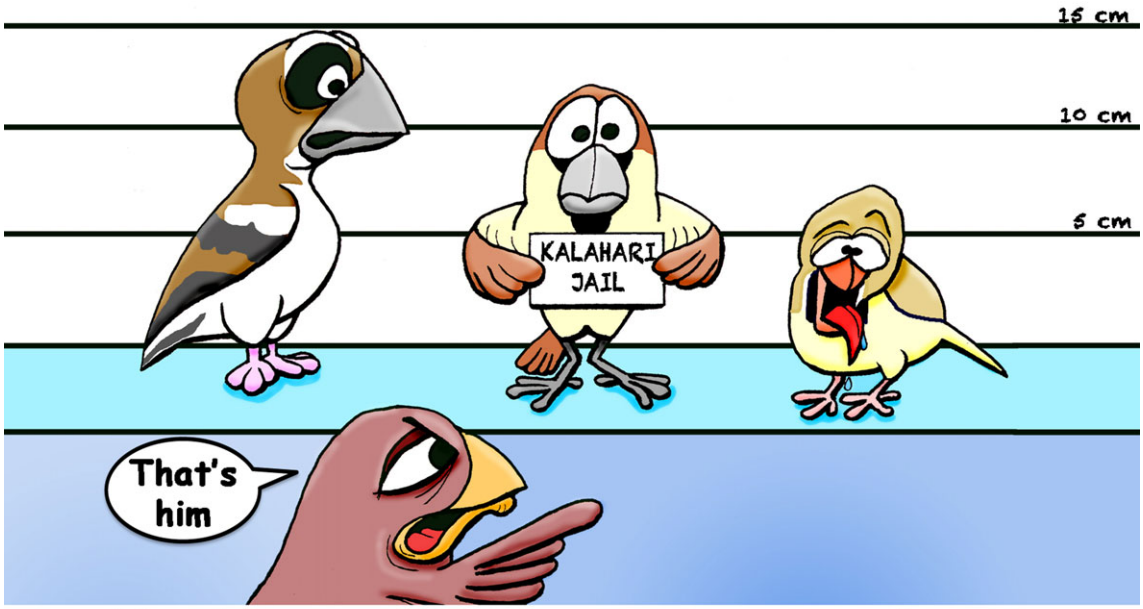
The Journal of Experimental Biology (2015) 218, 1615-1617

# Hot birds pant to keep cooler than air




**Although size was a factor, it was easy to pick out the smaller bird, who started to pant at a lower temperature**

Staying cool is crucial when the mercury rises, and if you choose to make your home in the desert it is even more essential. Many species rely on the cooling effects of water evaporation to prevent themselves from burning up, but little was know about how birds respond when temperatures rocket: how much heat they could tolerate and how those tolerances vary from small to large animals? Teaming up with Blair Wolf from the University of New Mexico, USA, Andrew McKechnie from the University of Pretoria, South Africa, decided to find out how three desert-dwelling song bird species [the tiny scaly-feathered weaver (10 g), the sociable weaver (25 g) and the large white-browed sparrow-weaver (39g)] cope in scorching conditions.

Carefully trapping birds in the arid southern Kalahari Desert, Wolf, Maxine Whitfield and Ben Smit gently injected a minute thermometer into the abdomen of the each of the birds before measuring the animals' body temperature, metabolic rate and water loss as the temperature increased gradually from 25°C to a sweltering 54°C. However, if the birds began to overheat, the team jumped in quickly, getting the animals' temperature back to normal by holding them in front of a chilly air conditioner while wiping them with ethanol.

Although the two larger species coped better than the small scaly-feathered weavers – which struggled to regulate their body temperature at air temperatures ranging from 44 to 50°C – the large white-browed sparrow weavers lost the ability to regulate their body temperature at air temperatures of 54°C and the sociable weavers failed at 52°C. In response to the high temperatures, the birds began panting heavily, with the scaly-feathered weavers increasing their evaporative water loss rates at the highest temperatures by 10.8-fold, while the sociable weavers and the large white-browed sparrow-weavers increased their evaporative water loss rates by 18.4- and 16-fold, respectively. And when the team calculated the birds' heat loss rates, they were impressed to see that the birds were able to dissipate heat at rates that were 41–122% above their normal metabolic heat production. Andrew McKechnie says, 'The birds were able to offload heat to the environment at a rate faster than they were producing it through metabolism', adding that the birds lose heat by evaporation to maintain a body temperature that is lower than the air temperature.

10.1242/jeb.125179

**Whitfield, M. C., Smit, B., McKechnie, A. E. and Wolf, B. O.** (2015). Avian thermoregulation in the heat: scaling of heat tolerance and evaporative cooling capacity in three southern African arid-zone passerines. *J. Exp. Biol.* **218**, 1705-1714.

**Kathryn Knight**
**Kathryn@biologists.com**