

# hot & HAPPENING

## White-browed Sparrow-weavers

A very significant event in the FitzTite's recent history occurred in 2004, when it was designated a Centre of Excellence (CoE) by the Department of Science and Technology and the National Research Foundation. One of the more tangible implications of the attainment of CoE status was a substantial funding allocation, facilitating interdisciplinary research and the training of top-quality postgraduate students. The advent of the CoE created exciting opportunities for collaborative research involving FitzTite academic staff and CoE members based at other institutions.

One such CoE-funded research programme is the Hot Birds project, initiated in 2009 by the late Phil Hockey (FitzTite) and Andrew McKechnie (University of Pretoria). Since its inception the project has expanded dramatically, and today involves researchers at three South African, one American and two Australian universities. The overarching aim of the Hot Birds project is to develop new approaches for predicting the impacts of climate change on birds, with a key focus on species inhabiting hot, arid environments, particularly southern Africa's Kalahari Desert.

During the first few years of the Hot Birds project, the White-browed Sparrow-weaver *Plocepasser mahali* emerged as an important species for understanding the effects of higher temperatures and more frequent heatwaves on arid-zone birds. This distinctive ploceid, perhaps best known for the clusters of untidy nests it builds in the outer branches of thorn trees, occurs over much of the southern African interior. The wide



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range of climatic conditions over which the sparrow-weaver occurs makes it ideal for understanding how behaviour and physiology vary regionally within widespread species, and how this variation might determine resilience to climate change.

Ben Smit's PhD project revealed that sparrow-weaver populations differ substantially in terms of their behaviour and physiology. During the course of two summers, he closely monitored body temperature and behaviour in two Kalahari populations that differ in the maximum air temperatures and overall levels of aridity they experience. The sparrow-weavers at Tswalu Kalahari Reserve had an average daytime body temperature approximately one degree Celsius lower than individuals living at a hotter, drier site 100 kilometres to the west.

Heat dissipation behaviour, such as panting and wing-drooping, also differed markedly between the two populations. On hot days, Tswalu's sparrow-weavers initiated these behaviours at significantly lower temperatures than their more heat-tolerant counterparts further west. The magnitude of the behavioural and physiological variation between these two sparrow-weaver populations is quite remarkable, particularly given their geographic proximity, and

*A White-browed Sparrow-weaver panting on a hot day in the Kalahari.*

Ben's findings were published in the journal *Ecology* early in 2013.

Other Hot Birds team members based at the University of Pretoria are continuing this line of research. MSc student Maxine Whitfield is examining the heat tolerance and evaporative cooling capacity of sparrow-weavers and other species in the Vanzylsrus area, and another MSc student, Matthew Noakes, is examining physiological differences between sparrow-weaver populations at the hotter western and cooler eastern edges of the species' range. This information will help to clarify the extent to which sparrow-weaver populations are adapted to particular climatic conditions, and provide insights into their capacity to cope with the warmer conditions of the future.

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