



WARWICK TARBOTON



NORTHERN GUARDIAN NEWSPAPER

## TAKING THE HEAT DESERT BIRDS AND GLOBAL WARMING

**H**igher temperatures associated with global warming could spell disaster for birds that live in very hot deserts. In regions such as the Kalahari and Sahara Deserts, mid-summer temperatures in the upper 40s and even the low 50s already present significant challenges to the ability of birds to avoid fatal heat stress. Disturbingly, climate-change models predict that nearly all the world's hot deserts will get even hotter during the 21st Century, with maximum temperatures expected to increase by 3-5°C by the 2080s. The massive bird mortalities that occur from time to time during heat waves in the deserts of western and central Australia, most recently in January 2009, provide a grim preview of how more intense and frequent heat waves may affect the birds of Africa's hot deserts.

Researchers at the Percy FitzPatrick Institute and colleagues at the University of Pretoria are currently using the Kalahari Desert as a model system to understand how extreme heat affects survival and reproduction in desert-living birds. This information will allow us to predict how global warming will affect birds inhabiting hot desert regions in southern Africa and elsewhere. In addition to increased adult mortality during severe heat waves, higher temperatures in coming decades are likely to lower reproductive success. Predictable impacts on reproductive success include both direct effects, such as more frequent embryo deaths from over-heating, and indirect effects, such as birds being forced to nest in more sheltered locations where nest predation rates can be considerably higher than in relatively exposed sites. This study attempts to understand exactly how higher temperatures will affect

*Dead Budgerigars Melopsittacus undulatus during a severe heat wave in western Australia in January 2009 (above). Is this a glimpse of the future for Kalahari Desert birds such as the Scaly-feathered Finch Sporopipes squamifrons (above, left)?*

the day-to-day lives of desert birds. We are tackling this question by examining the relationships between temperature and behaviour, such as the frequency of heat stress behaviour and drinking, and physiological variables such as body temperature and body water turnover.

A major goal of the study is to predict the consequences of global warming for the structure of desert bird communities. By integrating physiological, behavioural and ecological information, we will be able to link the effects of increasing temperatures on survival and reproduction in individual species to the resulting changes in desert bird communities. By identifying species that are likely to be forced out of desert areas in the face of rising temperatures, we will also be able to assess how or whether the functioning of those ecosystems will change.

We are urgently looking for a vehicle for this project, as well as funds for equipment, such as transmitters for monitoring birds' body temperatures on very hot days.

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