



ALBERT FRONEMAN

adapting

BIRD OF THE YEAR 2016 SOCIABLE WEAVER

TO A HOSTILE ENVIRONMENT

Sociable Weavers occupy the arid summer-rainfall regions of southern Africa, living in an extreme environment where they are exposed to temperatures that are very high in summer (regularly above 40 degrees Celsius) and sub-zero in mid-winter. Rain falls in unpredictable bouts during heavy thunderstorms in summer, but for much of the year water is scarce.

The species has several strategies for coping with these climatic extremes, one of the most obvious being its remarkable nest. The massive structure helps the birds survive by buffering both hot and cold extremes, making the temperature within the nest chambers generally much more stable than it is outside. The closer a chamber lies to the centre of the nest, and the deeper it is built into the nest mass, the greater are the thermal benefits in winter and summer. During the cold months, several weavers will pile into the same nest chamber, raising the internal temperature into the 20s even when it is below 10 degrees Celsius outside – and keeping themselves warm through the freezing night. Communal roosting

for warmth saves the birds considerable energy during the coldest parts of the year (energy that would otherwise be spent on generating additional body heat), probably reducing their foraging demands and enhancing their ability to survive the dry, cold winter when little food is available.

The birds themselves have physiological adaptations for surviving in the hostile environment. The metabolic rates of Sociable Weavers seem to be lower than those of birds from less harsh environments, especially during winter but also when the air temperature is very high. This might mean that their energetic costs of living are also reduced, perhaps enabling them to better cope with the unpredictable availability of food in the desert. These weavers eat both seeds and insects and, like many desert insectivores, they are able to survive almost entirely on liquid gained from their prey. They will, however, drink from waterholes and farm troughs and dams, particularly on hotter days or during very dry periods when less water-rich food is available.

Sociable Weavers maintain a normal body temperature of 40–41 degrees

Celsius, but they can cope with a body temperature up to about 44 degrees Celsius. Allowing controlled increases in core body temperature during extremely hot weather is called adaptive hyperthermia. Heat always travels ‘downhill’ (hotter objects will radiate heat away into a cooler environment, but cool objects will take up heat from hot surroundings), so when Sociable Weavers use adaptive hyperthermia to allow their bodies to increase in temperature, they can continue to offload heat to the environment. In addition, they use evaporative cooling (evaporating body water, usually by panting) to dissipate up to a remarkable 220 per cent of the heat their bodies produce through metabolism. Together, these strategies enable them to tolerate air temperatures of up to about 50 degrees Celsius and certainly help them to survive the hot summer extremes of the Kalahari.

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