

# The HEAT is on

By Jaco Badenhorst

My hands were sweating and the heavy rifle felt like a piece of lead in my palms. My sweat wet shirt was stuck to my body like a second skin and my bush hat could no longer keep the salty rivers of moisture that poured from my forehead out of my eyes. My feet were burning from the dry baked earth and my tongue was stuck to my top palate. The sun blazed down relentlessly and there was no shade in the leafless mopanie veld. I realized that I was busy dehydrating and I knew that I must replace the lost water soon if I want to keep up with the rest of the anti-poaching patrol and not lose face in front of these hardy bush wise black field rangers.

We were patrolling the eastern boundary of the Kruger National Park on the Lebombo Mountains just north of the confluence of the Olifants and Letaba Rivers. It was October month, better known as suicide month and extremely hot in this harsh rocky terrain. The Letaba Section Ranger told his black field rangers, when he dropped us off at sunrise, to take me on “a nice walk”. I was new to the area and it was custom those days for the field rangers to test a newcomer’s endurance. They did a very good job and I experienced the hottest, most uncomfortable walk that I have ever done to date. It was a small consolation for my self esteem when even the field rangers was happy to see the pick up vehicle and greedily gulped down the luke warm water out of the water bottles that we left behind on the back of the vehicle. I realized that day how dependent we as humans are on water and how important it is to keep cool on a hot day in order to conserve body moisture.

To be able to regulate body temperature is a very important aspect of animal physiology and can be a severe constraint for animals. When the body temp drops too low metabolic processes are slowed and the amount of energy for activities and reproduction are reduced. If body temp rises too high metabolic reactions become imbalanced and enzymatic activity is impaired or even destroyed. Animals can therefore only successfully function in a restrictive range of temp usually between 0° and 40°C. Animals must find the right habitat or they must develop the means of regulating body temp independent of temperature extremes.

Most mammals have body temp between 36° and 38°C. Birds range between 40° and 42°C. A balance between heat production and heat loss maintains this constant temp. Heat is produced by metabolism, which includes the oxidation of foodstuffs, basal cellular metabolism and muscular contraction. Heat is lost by radiation and conduction to a cooler environment and by the evaporation of water. Birds and mammals can control heat loss and production within wide limits. If the animal becomes too cool it can generate heat by increasing muscular activity (shivering or exercise) or decrease heat loss by increasing insulation. If it becomes too warm it can decrease heat production and increase heat loss.

In desert environments animals adapt despite harsh conditions such as heat during the day, cold at night, scarcity of water, vegetation and cover. Smaller desert animals dig burrows and are nocturnal. Kangaroo rats can derive all the water they need from their dry food, thus having to drink no water at all. Klipspringer, steenbok, dik-dik and duiker do the same to a lesser extend. These animals produce a highly concentrated urine and form almost completely dry faeces. However, all animals will drink water if it is available.

Larger animals cannot escape heat by living in burrows. It has been suggested that large antelope has horns not only for fighting and self-protection of the individual and their young but that horns and hoofs are also “heat windows” – places through which they loose excess heat. This has been proved in goats that up to 6% of body temp loss occur through the horns. This could be one of the reasons why both sexes have horns in desert and open plains game species. There is no/limited shade during the day under which to hide. Generally speaking they are also more active at night. Compare these antelope species to species found in bushveld or more dense vegetation areas or forest areas where only the male has got horns e.g. impala, kudu, nyala, bushbuck, waterbuck,

reedbuck, mountain reedbuck, klipspringer, duiker, steenbok (all prefer habitat where there is suitable cover/shade).

Eland, gemsbuck, springbuck and roan as an example have pallid, glossy coloured fur/hair that reflects direct sunlight and the fur itself is an excellent insulation that works to keep heat out. White belly fur also reflects radiation from below. Most of your desert antelope in general has large ears with a lot of blood vessels and bare skin on the inside of the ears to regulate heat (heat window).

Gemsbok has got a system that cools warm blood from the heart to the brain by letting it flow through a small network of bloodvessels (carotid rete situated below the brain). In other words the heart blood gets cooled down by blood coming from the nasal passages before it enters the brain and this takes place in the carotid rete.

Antelope doesn't really sweat or pant although they can under certain conditions and where their body temp rises above 41°C. Zebras, like horses sweat to regulate overheated bodies and maybe the stripes also got something to do with it. Elephants flap their ears to cool their blood. It has been said that a big bull can pump all the blood in its body, which is roughly 450 litres, through the blood vessels behind his ears in 20 minutes. I have also witness an elephant bull on the Nyalaland wilderness trail that sucked water out of his stomach with his trunk and then spray this water behind his ears in an attempt to cool the blood flowing through his ears even more. Elephants are very dependant on water and they will do this if they know that they can easily replace the lost water. I doubt if desert elephant will do the same. Asian elephants that live in water rich areas are known to do this more frequently.

Lions, leopards, cheetahs, hyenas and wild dogs pant. Hyenas, wild dogs and even baboons will submerge themselves in safe pools to cool down. Elephant, rhino, buffalo and warthog make use of mud wallows to cool down as well as controlling ticks and other parasites.

The hottest temperature ever officially recorded in KNP was on the 26<sup>th</sup> of February 1992 at Shingwedzi restcamp during a dry spell. The max. air temp. for this day was 48.0°C. The day before it was 46.5°C. I personally recorded a temperature of 44°C in the Nyalaland trail camp between Punda Maria and Pafuri in March 1993. This was air temp measured with a cheap thermometer – maybe not that accurate. Temperature in direct sunlight can be 4° to 5°C warmer.

Someone once said that there is only a wire mesh between Nyalaland wilderness area and hell. This was well illustrated while we were sitting in the Nyalaland trail camp lapa one hot summer during an afternoon break/siesta. One of the trailists was a big, fat irritating man in his mid forties who after the first five minutes after he introduced himself told me how much money he makes, how many expensive vehicles he has got and how many game farms he owned. He was sitting in the lapa and he sweated like a pig. He then said something that I will never forget. It does not matter who you are, how important you are or how much money you got - when the heat is on no one escapes it in the wilderness. He said: "Dat so 'n f@#\$% ryk man soos ek so f@#\$% warm moet kry!!" (I'm so f@#\$% rich, but I'm so f@#\$% hot). Nothing was going to cool him down in that situation.