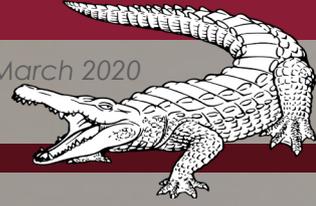




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# ELRC Niloticus News

March 2020



## Inleiding / Introduction



Die ELRC het besluit om 'n kort nuusbrieff uit te stuur, op gereelde basis, aan al die kommersiële krokodilboere in Suid-Afrika. Die maandelikse nuusbrieff sal per e-pos aangestuurd word. Die doel is om boere op hoogte te hou van die navorsing wat deur die Exotic Leather Research Centre (ELRC) gedoen word en om, waar nodig, aandag te skenk aan ander dringende krokodilsake. Meeste van die berigte sal ongelukkig in Engels wees, sodat ons dit weer kan gebruik vir ander doeleindes. Al die nuusbriewe sal op die ELRC se tuisbladsy gestuur word vir hergebruik agterna. In elke nuusbrieff sal 'n spesifieke krokodilprobleem (Specific Topic), baie kort, aangespreek word. Daar sal ook kontakbesonderhede

besikbaar wees vir direkte opvolggesprekke. Ons sal ook gereeld ander belangrike krokodilinligting (General News) deurgee, soos datums van werkswinkels, krokodilwelsyns-probleme en ander dringende krokodilsake.

All the newsletters will be stored on the ELRC webpage. You are welcome to contact us if you need more specific information or if you want to participate in some of the research projects. We need to work together to overcome all the obstacles that we are currently facing as an industry. The ELRC is involved with numerous national and international crocodile research projects. The idea is to forward relevant information, every month, through this newsletter,

to the crocodile farmers in South Africa. We are also in contact with crocodile and alligator farmers in other parts of the world.

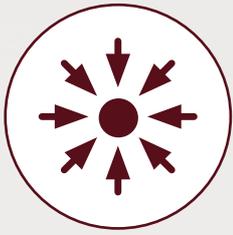
Christoff Truter prepared a short article focusing on high temperatures in crocodile houses or pens. We think that it is a real problem, which crocodile farmers seldom worry about. If temperatures are too high, and crocodiles do not have cooler areas that they can use to bring down their core body temperatures, deaths may occur. However, this is not our biggest concern – a bigger problem is that if the core body temperature is constantly too high, it will influence the growth, health and immune systems of farm crocodiles.



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# Specific Topic

## Temperature – something not to take lightly by crocodile farmers

Humans prefer a core body temperature of approximately 37 °C. Virtually all bodily functions (including digestion, immunity, hormone production, growth and development) occur at an optimum at this temperature. The 37 °C in actual fact is a narrow range of 36 °C to 37.5 °C. Similarly, crocodiles and other reptiles have a target range of temperature at which physiological functioning occurs optimally. The target body temperature ranges of reptiles are however wider, typically being  $\pm 3$  °C (6 °C wide) and not  $\pm 0.65$  °C as is the case with humans and most other mammals. The target preferred temperature range of Nile crocodiles has not been empirically described, but, crocodylian data suggests 28–33 °C as the target range for these animals. In other words, body temperatures between 28 and 33 °C will, in theory, enable optimal functioning for your crocodiles. Further research is, however, needed, and the ELRC is in the process of characterising the thermal preference of Nile crocodiles as part of a doctoral thesis.

Research has shown that crocodylians cannot tolerate high temperatures and death may occur at core body temperatures of 37 °C and higher!

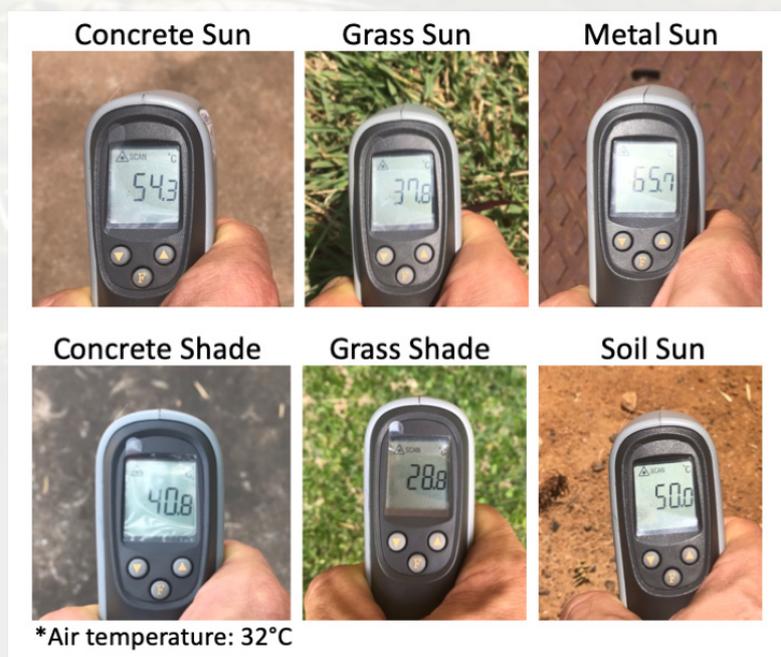
A temperature of 39 °C will almost certainly be fatal. Humans are extremely efficient in cooling down, primarily through evaporative cooling during sweating. We are therefore able to tolerate relatively hot temperatures without ill effect.

Crocodiles are less fortunate and options for cooling are limited to seeking shade or cooler water (movement), gaping or modified blood flow to the bones present in dorsal scales (osteoderms), which act as radiators.

Pens on crocodile farms can be a death trap for crocodiles if care is not taken, with no place to escape. Size is a saving grace for these creatures and their large bodies buffer the effect of extreme temperatures due to less rapid warming or cooling rates. For example, an animal with a body size of 5 kg will take about 2.5 hours to heat to the environmental temperature, whereas a hatchling crocodylian or small lizard will reach operative temperature within minutes. Risk of overheating and subsequent death is therefore a greater concern for hatchlings and early juveniles. Just a few minutes on a hot surface such

as concrete and they are “toast”. The buffering offered by larger body mass may, however, not offer enough protection if temperatures are extreme and cooler microclimates are not available.

Death due to overheating is not the only concern associated with high temperatures. Chronic exposure to high temperatures will stress crocodiles, which in turn will have a negative impact on health due to compromised immunity and oxidative stress. Limited research has been performed regarding heat stress in crocodylians. However, we can learn much from other production animal industries, such as poultry, where heat stress is a major challenge and has been studied in depth. Some of the negative effects of heat stress that have been confirmed in poultry are reduced growth and egg production, reduced



egg quality, compromised immunity, changes in hormone levels, oxidative stress, altered gut microbiota and poor meat quality. Compromised immunity and oxidative stress are of particular interest for farmed crocodiles, because of the associated lowered resistance to infections and potential negative impact on skin quality.

Surely you have noticed the thermometer on the wall may read 30 °C, but the temperature of concrete slabs or the bonnet of your car can be over 45 °C. To illustrate the high temperatures crocodiles are potentially exposed to, we measured the surface temperatures of different substrates on a typical hot summer day in Pretoria (air temperature of approximately 32 °C).

Concrete slabs, similar to those present on most crocodile farms, were 54.3 °C, whereas concrete in the shade was 13.5 °C lower at 40.8 °C. Grass was markedly cooler at 37.8 °C in the sun and 28.8 °C in the shade. Clearly, exposed concrete poses a risk of overheating on crocodile farms if not managed appropriately. Natural vegetation buffers the effect of extreme temperatures as indicated by the cool temperatures we observed on the grass compared to bare soil or concrete. It is no wonder the famous veterinarian, Dr Percy Sharp, has theorised that overgrazing and vegetation loss is the main driver of global warming.

Are your animals heat stressed? Do your crocodiles form dense aggregations in shaded areas in

a pen? This may be a sign that they are heat stressed. You could increase the shade intensity to test whether the animals prefer the areas of more intense shade. Shaded areas covering ponds can provide further shelter from heat. It will be advantageous to monitor air, substrate and body temperature on crocodile farms on a regular basis, especially during extreme temperatures. Core temperature can be measured by placing a thermometer a few centimetres into the cloaca shortly after capture.

The ELRC has a project focused on temperature and behaviour on commercial crocodile farms.

For more information, contact Dr Christoff Truter: [christoff.truter@up.ac.za](mailto:christoff.truter@up.ac.za)

## General News

### Crocodile workshop



The ELRC plans to have a one-and-a-half day crocodile workshop in May 2020. The idea is to invite speakers to focus on specific and relevant crocodile problems.

Part of the workshop will also be a half-day practical with Johan Steyl and Jan Myburgh.

We have done it before and it was thoroughly enjoyed by everybody who attended it.

The workshop will be held at the Faculty of Veterinary Science, Onderstepoort. Accommodation is available close by.

More details in the next newsletter.



## Next issues

The specific topic in next month's issue (April) will be e-stunning.

