

# **High lead exposure and clinical signs of toxicosis in wild Nile crocodiles (*Crocodylus niloticus*) from a World Heritage Site: Lake St Lucia estuarine system, South Africa**

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***Abstract:*** Lead (Pb) exposure is a widespread wildlife conservation threat, but impacts on reptile populations remain poorly documented. In this study, we examined Pb exposure and accumulation in a wild population of Nile crocodiles (*Crocodylus niloticus*) at the Lake St Lucia estuarine system, South Africa. Recreational angling has occurred in the area since the 1930s and incidental ingestion of Pb fishing weights has previously been identified as a major source of Pb poisoning in the local crocodile population. In 2019, we sampled blood and tail fat tissues from wild (n = 22) and captive (n = 3) crocodiles at Lake St Lucia to investigate potential impacts of chronic Pb exposure on crocodilian health. Lead was detected in blood samples of all wild crocodiles, although concentrations varied widely between individuals (86 - 13100 ng ml<sup>-1</sup>). The incidence of Pb poisoning was higher in male crocodiles, with mean blood lead (BPb) levels in males (3780 ± 4690 ng ml<sup>-1</sup>) significantly (p < 0.001) higher compared to females (266 ± 230 ng ml<sup>-1</sup>). Blood Pb levels were correlated with concentrations measured in tail fat tissue (n.d - 4175 ng g<sup>-1</sup> wet wt.). Although most of the crocodiles sampled appeared to be in good physical condition, highly elevated BPb levels (> 6000 ng ml<sup>-1</sup>) were associated with markedly suppressed packed cell volumes (4.6 - 10.8%) and severe deterioration in tooth condition. These findings suggest that anaemia and tooth loss may be clinical signs of long-term environmental exposure to Pb. Although previously undocumented in crocodilians, these symptoms are consistent with Pb poisoning observed in birds and mammals, and suggest that crocodilians may be more susceptible to the long-term toxic effects of Pb than previously thought. In light of these findings, we suggest that the impact of accumulated Pb on crocodilian fitness, reproduction and mortality requires urgent attention.

***Keywords:*** Pb, Nile crocodiles, Lake St Lucia

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