

New look at crocodile eyes

May 5 2016, by Jess Reid



Researchers from The University of Western Australia and Macquarie University have discovered that the visual systems in crocodiles are more cleverly designed than previously thought, allowing them to quickly adapt to their environment and facilitating their 'ambush' hunting techniques and semi-aquatic lifestyles.

Although general features about a crocodile's vision are known, there has previously been little knowledge about their retinal adaptations.

Nicolas Nagloo, a PhD student from UWA's School of Animal Biology, one of the key researchers involved in the study, said that [crocodiles](#) were excellent predators that were well known for quietly waiting at the water's edge before attacking their prey with a burst of speed.

"They are experts at ambushing prey while remaining concealed and their heightened vision plays a big role in this," Mr Nagloo said.

"The water surface makes up the majority of the bottom of the visual field and the visual horizon occurs along the riverbanks where crocodiles see best."

Mr Nagloo said that while the vision of saltwater and freshwater crocodiles was similar above the water's surface, the light conditions were significantly different when the animals were under water.

"In [freshwater habitats](#), there is a lot of long wavelength [red] light," he said. "In contrast, saltwater habitats have a broader range of wavelengths, providing a greater amount of short wavelength [blue] light."

The researchers compared the eyes of the two crocodile species and found that instead of having a compact fovea (a depression in the retina where there is a high density of photoreceptors that provide a high resolution view of the world), the foveae of saltwater and freshwater crocodiles was stretched across the back of the eye in line with the horizon.

"This provides the crocodile with increased visual clarity and the ability to see fine detail without moving their head," he said.

Mr Nagloo said that the researchers had investigated the sensitivity of different photoreceptors in both species' eyes, and were surprised to learn that crocodiles have relatively sophisticated colour vision, provided by three colour-sensitive cones.

"The sensitivity of the [saltwater crocodiles](#)' colour photoreceptors was slightly shifted to shorter (bluer) wavelengths compared with that of the photoreceptors of the freshwater crocodiles, even though neither species

can focus underwater, suggesting they may use their [vision](#) underwater more than we have previously thought," he said.

"The subtle difference between the visual systems of the two Australian species gives each an advantage in their environments."

Provided by University of Western Australia

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