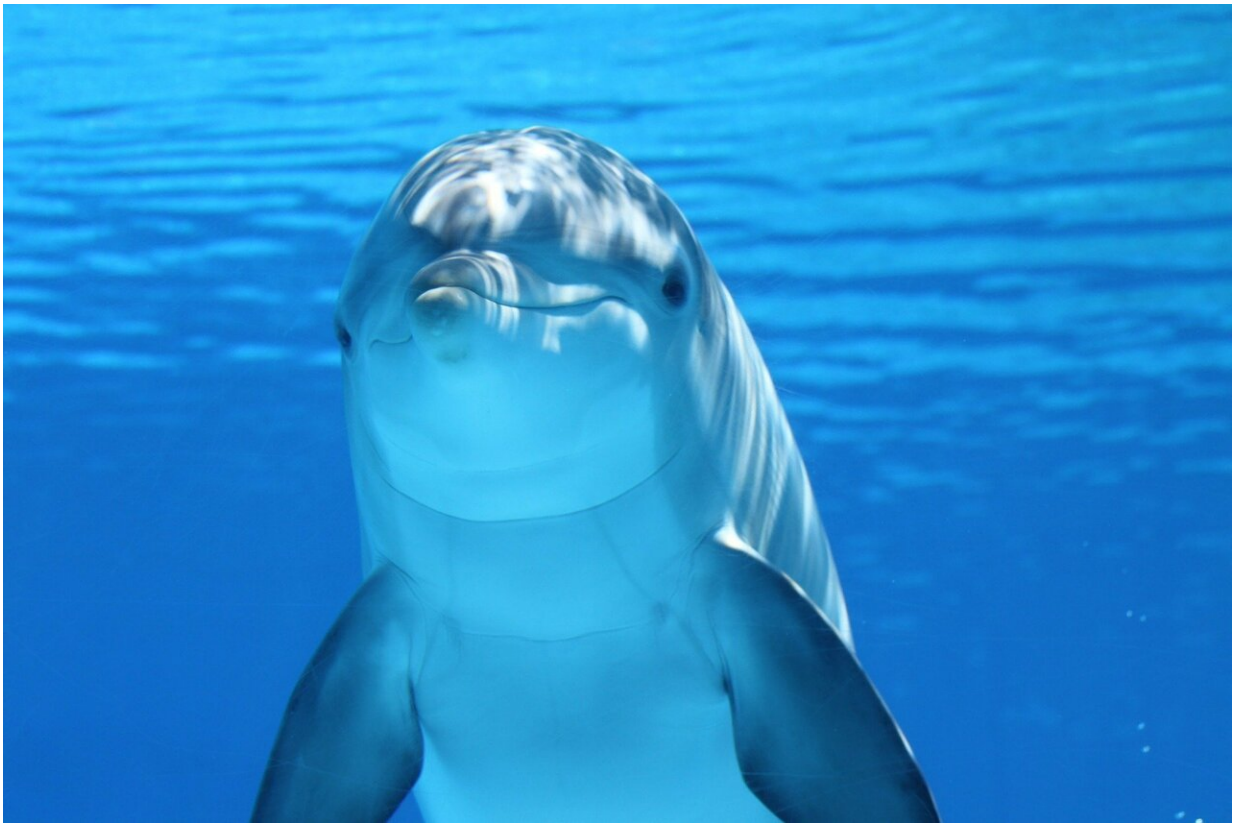


Dark-shaded body surface the key to animals avoiding predators

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Animals that have a darker pigmented surface on the upper side of their body compared to those that have the same shade all over can reduce the impact of their body shadows and remain hidden from predators,

according to a new study by researchers at The University of Western Australia.

Although scientists have understood the pattern called countershading for some time, the research published today in *Proceedings of the Royal Society*, offers an explanation for how this effective patterning technique protects some animals from predators.

Callum Donohue, a Ph.D. candidate from UWA's School of Biological Sciences, said the research used a unique experimental model which combined methods from vision science and behavioral ecology to determine how countershading influenced the visibility of prey and recognition by predators.

"Our research suggests that animals which have countershaded patterning are able to reduce their visibility and the subsequent probability of being attacked, as the levels of contrast they generate in response to sunlight is lower than animals without countershading patterning," Mr Donohue said.

Animals that have a countershaded pattern can reduce the level of shadows caused by light sources hitting them which removes cues that reveal their three-dimensional form, disrupting the detection and recognition systems of predators.

The researchers used an aquarium attached to a computer monitor that displayed a range of simulated countershaded and non-countershaded prey to the predatory occupants of the tank, western rainbowfish.

"The uniquely designed experimental system allowed us to finely control viewing angles and backgrounds of the simulated prey while measuring the response timing and attack probability of the fish," Mr Donohue said.

Similar studies have used humans as predators in the experimental method due to the difficult nature of measuring how color patterns are viewed by animals.

"Humans have very different visual systems to other animals, which has limited our ability to understand the function of animal patterns."

The new findings make an impact on existing research by examining new ways to measure how [animals](#) perceive patterns, including 3-D shapes.

"We feel our research findings provide much needed and valuable insight into the evolution of visual systems and the assumptions that surround object detection."

More information: Callum G. Donohue et al. Countershading enhances camouflage by reducing prey contrast, *Proceedings of the Royal Society B: Biological Sciences* (2020). [DOI: 10.1098/rspb.2020.0477](https://doi.org/10.1098/rspb.2020.0477)

Provided by University of Western Australia

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