PLOS Science Wednesday: Hi Reddit, my name is Simon and I discovered that thresher sharks use their tails to hunt prey and published the results of the study in PLOS ONE – Ask Me Anything!

PLOSScienceWednesday [1] and r/Science AMAs[1]

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the WINNOWER

REDDIT

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PLOSSCIENCEWEDNESDAY R/SCIENCE

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CORRESPONDENCE:

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If you had to choose the most unique predator-prey interaction or the most interesting marine hunting technique, what would it be?

TomShrugged

Tail-slapping of course! In sharks, this behaviour is unique to the alopiids (thresher sharks) and might be considered interesting for a variety of reasons. For instance, while we were analysing our video data, we noticed plumes of bubbles being released into the water column at the apex of the arc that formed the travel path of the tip of the tail for many of the tail-slaps that we observed. Tail-slaps appear to occur with such force that they cause dissolved gas to diffuse out of the water column in a fluid dynamics process known as cavitation. Unfortunately we were unable to report the intricacies of this process due to very valid points raised by our reviewers. However, I remain convinced that localised explosions caused by cavitation play a part in the relative efficiency of this unusual hunting strategy.

Hi Simon,

I know nothing on this subject, but just out of curiousity: Do they only use their tail for hunting or do they use it in other "unusual" ways like defense?

TheRealShazoo

We've been studying these sharks in their natural environment since 2005. From our 2000 or so hours of video observations, we have no evidence to suggest that they use their tails for anything but hunting and locomoting.

As a functional morphologist, this slam dunk-looking tail slap prey stunning behavior is very surprising because it doesn't seem to have very obvious precursors. What behavior do you think this evolved from and is there evidence of what other function this unique tail design might be involved in? This leads to the chicken and the egg question... did the behavior evolve before the crazy tail or vice-versa?

Jobediah

We know from stomach content analyses that thresher sharks “like” prey items that aggregate in shoals (sardines and squids for example). Since we have no evidence that the unique tail design has any other function than to hunt and locomote with, my suspicion is that tails and tail-slapping coevolved in response to the defensive schooling behaviour of their available/preferred prey. In this context we might consider tail-slapping to be an efficient strategy since thresher sharks are able to debilitate and consume more than one prey item at a time (we observed up to seven).

I don't mean to sound rude or demean your work in any way, but didn't we already know this to be the purpose of their incredible tails?

pointloader

Not exactly. It has indeed long been speculated that thresher sharks hunt with their tails. In fact the first description of thresher shark hunting behaviour dates back to 1923 when Allen published surface observations that he made from a pier of what he thought was a common thresher “coach” whipping a California smelt in Science. Decades later Aalbers et al. (2010) showed that under controlled conditions common thresher sharks were able to make contact with tethered bait using their caudal fins. While it has been suggested that bigeye and pelagic thresher sharks employ similar methods of hunting to those described for common thresher sharks, the kinematics that structure alopiid predatory behaviours in the wild have not been previously documented. The novelty of our paper stems from the analyses that we undertook of thresher sharks interacting with natural prey in the wild.

Are there any known or suspected negatives/downsides to the thresher shark tail that would offset its usefulness in hunting?

KropotkinWasRight

Not that we know of. It appears to be perfectly fit for purpose!