

Researchers reveal secrets of duck sex: It's all screwed up

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Female Mallard. Image: Wikipedia

Female ducks have evolved an intriguing way to avoid becoming impregnated by undesirable but aggressive males endowed with large corkscrew-shaped penises: vaginas with clockwise spirals that thwart oppositely spiraled males.

More details of this evolutionary battle of the sexes fought at the level of genitalia are described by Yale researchers in the December 23 issue of the journal [Proceedings of the Royal Society B](#).

"In species where forced copulation is common, males have evolved longer penises, but females have coevolved convoluted vaginas with dead-end cul-de-sacs and spirals in the opposite direction of the male penis," said Patricia L.R. Brennan, lead author of the paper and postdoctoral researcher in the Yale Department of Ecology and [Evolutionary Biology](#). "This coevolution results from conflict between the sexes over who is going to control fertilization."

The research builds upon a 2007 Yale study that first described the strange morphology of a duck's sexual organs. While most birds have no phalluses, ducks turn out to have relatively large, flexible penises—up to 20 centimeters—tucked inside their bodies. During sex, male ducks extend, or evert, their phalluses inside the female. Brennan

and her Yale colleagues used high-speed video to document the erection of the duck penis for the first time and found the whole process takes less than half a second—an act the Yale team described as "explosive."

Such large phalluses are supposed to give males a reproductive advantage when there is much forced mating. However, the Yale team hypothesized that females could make copulation difficult for the males with their complex [genitalia](#). And, they wondered, do the convoluted vaginas of some waterfowl help those females exclude forced copulation?

To test the hypothesis, Brennan and colleagues examined duck penis eversion in a set of glass tubes with different shapes. A straight tube or a tube that spirals in the same counter-clockwise direction as the male penis doesn't slow down the eversion process. But glass tubes that mimic the female vaginal shapes with a clockwise spiral or a sharp bend can completely stop the penis from everting. These results suggest females have evolved anatomical mechanisms to impede forced copulation, and provide new insights into the evolutionary consequences of sexual conflict over reproduction, say the scientists.

The anatomical evolutionary race to control reproduction is one of the more dramatic examples of sexual conflict in nature.

"Although we predict that sexual conflict should be ubiquitous, finding a system where the 'arms race' between the sexes is so dramatic is exceedingly rare. Ducks are providing us with an incredible opportunity to understand the evolutionary consequences of conflict," said Brennan.

Provided by Yale University

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