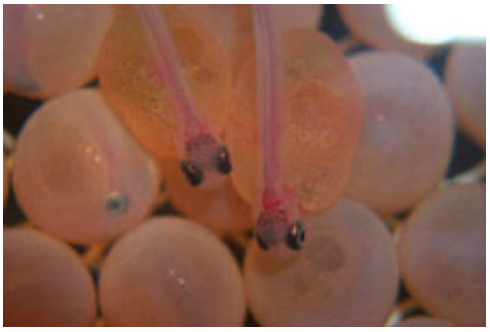
Study of salmon sperm success shows need for speed

October 30 2013



(Phys.org) —When salmon spawn, males competing to fertilise eggs will win or lose based primarily on their sperm swimming speed, according to a collaborative study by researchers from the University of Otago and the University of Western Australia.

In the study published today in the *Proceedings of The Royal Society B* the researchers attempted to disentangle the relative importance of male, female and interactive effects on fertilisation success in this externally fertilising species.

Study co-author Professor Neil Gemmell of Otago's Department of Anatomy says that although sperm competition is rife among sexually reproducing species, little is known about the factors that determine

which sperm successfully fertilise eggs.

The researchers focused on Chinook salmon, Oncorhynchus tshawytscha, a species in which the female's ovarian fluid is thought to influence her choice for genetically compatible mates.

Professor Gemmell says the researchers used competitive IVF experiments to try to explain why sperm from certain males are more successful in the competition to fertilise eggs than others.

In particular, they wanted to tease out the relative influence of female effects (ovarian fluid), male-by-female interaction effects (i.e. male-female genetic compatibility, mediated by interactions between sperm and ovarian fluid), and intrinsic differences among males in their sperm competitive abilities.

The results reveal no evidence for female or compatibility effects, but show that sperm competition is overwhelmingly determined by male effects, largely attributable to differences in sperm swimming velocity between competing ejaculates, Professor Gemmell says.

The researchers concluded that "Together, these findings provide evidence that variation in paternity success can be attributed to the differences in the sperm's ability to compete against rival males, and reveal that sperm swimming speed is a key target of sexual selection."

More information: The Trojan Female Technique: A novel, effective and humane approach for pest population control, rspb.royalsocietypublishing.or … .1098/rspb.2013.2549

Provided by University of Otago