

Biologists identify influence of environment on sexual vs. asexual reproduction

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Evolutionary biologists at the University of Toronto have found that environment plays a key role in determining whether a species opts for sexual over asexual reproduction.

The study, led by post-doctoral student Lutz Becks and Professor Aneil Agrawal of the Department of Ecology & Evolutionary Biology, found that species that inhabit spatially heterogenous environments – habitats characterized by uneven concentrations of its own species among a rich variety of other animals and plants – had higher rates of sexual reproduction than those in more homogenous environments.

"Sexual reproduction is pervasive across the tree of life," says Agrawal. "One of the classic questions in evolutionary biology is to determine why most organisms reproduce sexually rather than asexually. Whatever evolutionary force maintains this mode of reproduction across such a diversity of life must be one of the most powerful and important factors in biology. Our work suggests that spatial heterogeneity is one of these key factors."

Furthermore, sexual reproduction resulted in organisms that are adept across different environments, with different characteristics and more robust genetic constitutions than their asexually-reproducing counterparts.

"Put simply, sexual reproduction helps create genotypes that are better able to survive across different environments. In contrast, <u>asexual</u>



<u>reproduction</u> yields types that are suited to only one environment," says Agrawal."

The scientists conducted their experiments with rotifers – small aquatic organisms that are capable of both sexual and asexual reproduction. They allowed populations of rotifers to evolve in habitats that were either environmentally homogeneous or heterogeneous. Over a span of more than 70 generations, the tendency for <u>sexual reproduction</u> persisted at much higher levels in heterogeneous habitats and declined rapidly in homogeneous environments.

More information: The findings appear in the paper "Higher rates of sex evolve in spatially heterogeneous environments" published October 13 in *Nature*.

Provided by University of Toronto

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