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Tragedy Of The Commons" - Aggression In Evolution Could Make Species Extinct?

By *News Account*

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Aggression in mating males is a successful reproductive strategy for individuals but a numerical model says it can drive a species to extinction,

Evolutionary biologists have long debated whether the behavior of the individual is able to influence processes on a population or species level but the possibility of selection at the species level remains controversial. Using a mathematical model, an international team of researchers now say that aggressive male sexual behavior not only harms the female, but can also cause entire populations to die out.

For their study, the scientists concentrated on the extreme sexual conflict of seed beetles. Male seed beetles have barbed penises (see also [Seed Beetles And Rough Sex](#)) which make it impossible for the female to shake off an unwelcome mate. The aggressive males have a higher reproductive rate as they are more successful than less aggressive males; however, they harm the female during the mating process. The researchers have now shown that the greater mating success of aggressive males can result in the males of a species becoming more aggressive in general.

The aggression spiral has dramatic consequences for the population and species: More females are harmed during mating and die from their injuries. This means the females become scarcer as a resource for the males and the species eventually dies out. Individual interests and the interests of the population contrast greatly in the present case.

In economics they call those clashes of individual and group interests the "tragedy of the commons". The principle refers to the overexploitation of collective resources and serves, among other things, to describe human dilemmas related to environmental pollution and taxation. In nature, the tragedy of the commons is limited as aggressive behavior is costly for the individual. This also explains why such severe sexual conflicts as in the case of the seed beetle cannot be observed everywhere. Species with too high an injury rate during reproduction have driven themselves to extinction in the course of evolution. In the case studied, the female's tactical response is to steer clear of aggressive males.

"In nature, there are many examples of tragedies of the commons," says evolutionary biologist Daniel Rankin from the University of Zurich - understanding how nature solves

the tragedy of the commons could also inspire solutions to human problems.

The paper was published in the journal *The American Naturalist* and funded by the Swiss National Science Foundation (SNSF).

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