

The cost of keeping eggs fresh for mother cockroaches

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A cockroach mom shelters her newborn babies. Credit: by Allen Moore

One of the defining differences between the sexes is in the size of their gametes. Males make many tiny sperm while females make only a few large eggs. This suggests that sperm are cheap while eggs are expensive.

Yet sperm can be very long lived, while eggs degenerate quickly after they are made if they are not fertilized . Why don't females take better care of their expensive eggs? After all, if the females don't use their eggs they have fewer offspring, whereas males make more sperm than they will use anyway.

This evolutionary conundrum – there should be selection for females to keep their eggs fresh until they are used – has recently been studied by

Dr. Trish Moore and her colleagues at the Cornwall Campus of the University of Exeter, with support from NERC, and is published in the March issue of *The American Naturalist*.

Moore and colleagues examined why females don't keep their eggs fresh in a cockroach where females mate only once during a reproductive cycle, give live birth, and therefore are choosy about the male with which they will mate. Females can't be too choosy, however. If they wait too long to mate they lose good quality oocytes through programmed cell death.

But Moore's team finds that some females have genes that would allow them to maintain eggs even if they delay mating. So why aren't all females delaying cell death and holding onto their eggs? Moore speculates that perhaps these genes play a dual role and while they may be beneficial under one environment, when females don't mate, they might be harmful under another, such as when food is limiting.

"When females are starving, hanging on to yolky eggs full of nutrients is bad. Instead a female could recycle those nutrients into her survival. So females face a decision between keeping eggs fresh for producing offspring now, or using those nutrients herself and taking the chance she can reproduce later." The group is currently investigating this trade-off arising from a conflict over food or sex. Although this is a new twist in the conflict over food or sex, the result is a familiar one in evolutionary biology; it is hard to be best at everything.

Source: University of Chicago

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