

When it's cool, female butterflies chase males in sex role reversal

January 6 2011



When temperatures are cooler, female *Bicyclus anynana* actively court males, which take on the same role when temperatures are warmer. Credit: William H. Piel and Antonia Monteiro/Courtesy of Yale University

If you want to be surrounded by females on the prowl, it pays to be cool, at least if you are a male butterfly.

In an unusual example of sex role reversals, females actively court males after being exposed to cool, dry temperatures as [caterpillars](#), Yale University researchers report in the Jan. 7 issue of the journal *Science*. Raised in the moist and warmer [season](#) as [larvae](#), males take up the

traditional roles of suitor, displaying their wing designs to females who do the choosing.

"Behavior in these butterflies is changed by the temperatures experienced during development," said Kathleen L. Prudic, post-doctoral researcher in the department of ecology and evolutionary biology and co-author of the paper.

Those females raised in the cooler season and actively courting males will live longer lives once they mate relative to their mated counterparts in the hotter season who are engaged in more passive mate shopping.

The research began when Prudic and Antonia Monteiro, professor in ecology and [evolutionary biology](#), asked why female squinting bush brown butterflies or *Bicyclus anynana* had beautiful ornamental patterns shaped like eyes on their wings just as males did. In most species, males end up with often elaborate and colorful ornamentation to attract mates while females, who do the selecting, tend toward duller displays. The researchers theorized that perhaps courtship behavior might change given different [environmental conditions](#). They tested the behavior of butterflies raised in larval stage at 27 degrees C and at 17 degrees C.

As expected, female *Bicyclus anynana* in warmer moister conditions that mimic the wet season in the native African range were more likely to mate with males with ornamented wings. However, the roles were reversed in cooler drier climates. Females played the role of suitors and flashed their eye spots to choosy males. When scientists studied the wing spots, which reflect light in the UV range, invisible to humans, they found they were brighter in the courting females relative to the males of that same season, or relative to females raised in the hotter season.

Prudic said that male [butterflies](#) also deliver nutrients as well as sperm during mating and that in less than optimal times for reproduction (the

dry cool season) these male offerings appear to lead to increased female longevity. Females want to survive through the dry season and furiously display to as many males as possible in order to obtain these resources from males. Males, on the other hand, become very careful about choosing who they give these resources to because once they do, they live shorter lives. Only the ladies carrying bright eyespots have a good chance of attracting a mate.

Provided by Yale University

Citation: When it's cool, female butterflies chase males in sex role reversal (2011, January 6)
retrieved 24 April 2024 from
<https://phys.org/news/2011-01-cool-female-butterflies-males-sex.html>

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