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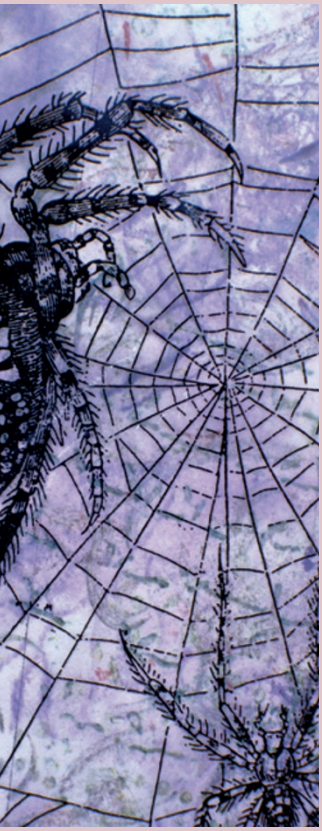

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EVOLUTION

Evidence of group selection shown in social spiders

Group selection drives the composition of colonies of *Anelosimus studiosus* — a species of social spider in which the females show either 'docile' or 'aggressive' phenotypes — according to the results of a new study published in *Nature*.

Female *A. studiosus* spiders are behaviourally polymorphic, and natural colonies are composed of a mixture of docile and aggressive individuals. In this study, the authors sought to find out whether the reason that colonies differed in their compositions was that different sites actually select for different ratios of females.

To investigate the possibility of group selection, colonies of various sizes (1–27 females) and phenotypes (0–100% aggressive) were created and deployed across 6 field sites (3 high-resource sites and 3 low-resource sites). The success of these colonies was then monitored over two generations, and the compositions of colonies that survived were recorded over time. "If groups had evolved to exhibit compositions that best promote their survival and reproductive success, then colonies that fall outside of the normal distribution of compositions seen in nature should suffer or perish," says Jonathan Pruitt, lead author of the study.

The researchers found that experimental colonies with compositions similar to that of local populations produced almost ten times as many offspring as those with dissimilar mixtures, and colonies with extremely dissimilar mixtures produced no offspring colonies. "When I transplanted colonies across sites, I observed that they were not able to adjust their mixture to match local colonies," explains Pruitt. "Instead, transplanted colonies continued to recreate the mixtures that would have promoted their success, were they still at their home sites."

Importantly, these findings indicate that group selection can drive the composition of locally adapted wild populations and that evolution favours traits that maximize the success of the group in their native habitat, as perturbed colonies adjusted their composition towards ratios that would increase their chances of survival in their native environment. Therefore, the mechanisms behind this phenomenon are likely to be locally adapted and genetically influenced.

The researchers now plan to focus on deciphering the ways in which colonies actually fix their composition and how over-abundant phenotypes are eliminated. "We might one day be able to implicate the genes that underlie colonies' ability to adjust their compositions," concludes Pruitt.

Bryony Jones

ORIGINAL RESEARCH PAPER Pruitt, J. N. & Goodnight, C. J. Site-specific group selection drives locally adapted group compositions. *Nature* http://dx.doi.org/10.1038/nature13811 (2014)