

Size, personality matter in how Kalahari social spiders perform tasks

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This photo shows a pair of *Stegodyphus dumicola* females beside the colony retreat in the field. Credit: Carl Nicolas Keiser

At first glance, colonies of thousands of social spiders all look the same and are busy with the same tasks. Not so, says researchers Carl Keiser and Devin Jones of the University of Pittsburgh in the US, after carefully studying various gatherings of *Stegodyphus dumicola* social

spiders of the Kalahari Desert in South Africa. The size and condition of a particular spider's body indicates which task it generally performs within a colony. In addition, neighboring colonies can have different "personalities" too, writes Keiser, lead author of a study published in Springer's journal *Behavioral Ecology and Sociobiology*.

Stegodyphus dumicola [spiders](#) live in [colonies](#) of up to 2,000 members in thorn trees in the arid parts of southwestern Africa. The spiders build large webs consisting of dense communal living areas and a two-dimensional capture web. To study them, Keiser and his colleagues transported various colonies collected in the southern Kalahari Desert to their laboratory at the University of Pittsburgh. They then carefully watched to what extent individuals were involved in tasks such as attacks, web building or web repairing.

Keiser and his colleagues believe that such studies are vital to understand how the traits and actions of individuals combine to form and develop the social organization and collective behavior of a particular species. In the case of *Stegodyphus dumicola*, the research group found that body size and body condition influence the chances that an individual spider will perform a range of tasks needed to maintain the colony. Spiders with smaller bodies are more likely to help with web building and maintenance. Those who are in better condition tend not to capture prey, while those with lower body condition are more likely to be busy with foraging.

A colony's "personality" or collective behavior is best predicted by the variety of individual spiders living within it. Colonies with members with different body sizes or aggression levels contain spiders which are slower to emerge from their nest to attack prey. Variation in boldness within colonies is in turn linked with better chances that more individual spiders will take part in standard [web building](#) activities.

"The results are intriguing because this trait variation and its resulting task differentiation gives rise to a cooperative breeding society composed of highly related, inbred individuals. The spiders are of nearly identical age and develop together in synchrony," explains Keiser. "Our findings differ from the once conventional reasoning among social spider researchers that social spider societies are homogenous and egalitarian."

More information: Keiser, C.N. et al (2014). Exploring the effects of individual traits and within-colony variation on task differentiation and collective behavior in a desert social spider, *Behavioral Ecology and Sociobiology*. [DOI: 10.1007/s00265-014-1696-9](https://doi.org/10.1007/s00265-014-1696-9)

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