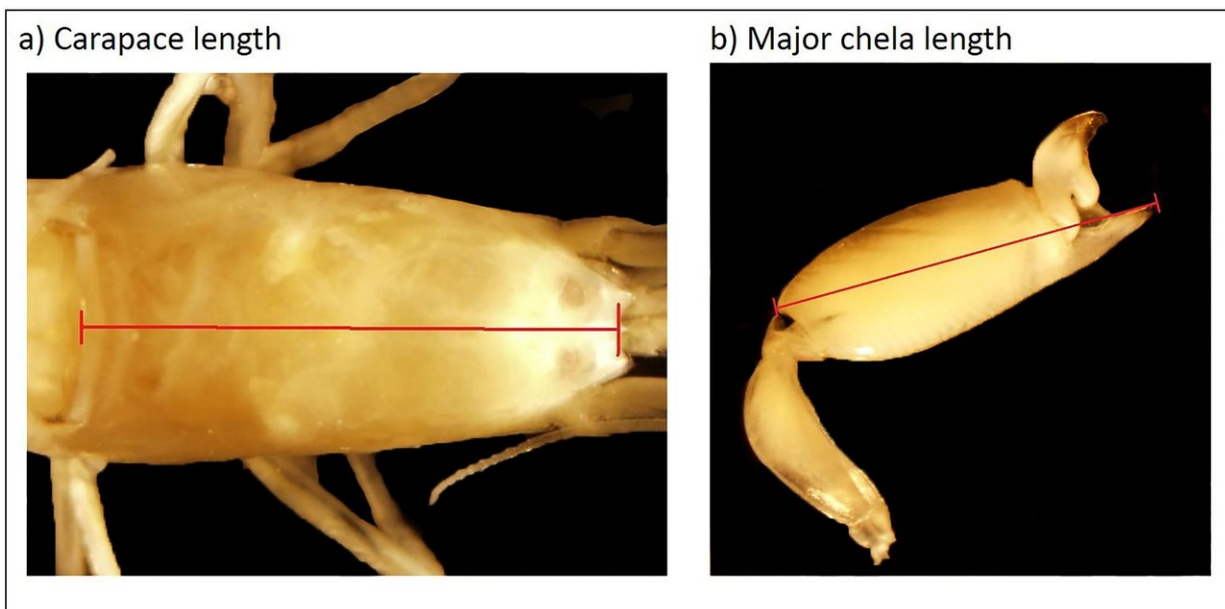


Tradeoffs between weaponry and fecundity in snapping shrimp queens vary with eusociality

March 14 2018



Allometric measurements for (a) carapace length and (b) chela length on preserved, sponge-dwelling shrimp. Credit: Bornbusch et al (2018)

Amongst species of colonial snapping shrimp, the capacity for defense versus reproduction in queens varies with the level of cooperation, according to a study published March 14, 2018 in the open-access journal *PLOS ONE* by Sally Bornbusch from Duke University and colleagues.

Snapping shrimp in the genus *Synalpheus* are the only marine organisms that are eusocial, that is, reproduction is skewed to the queens, and colonies defend their territories cooperatively. The degree of eusociality varies amongst *Synalpheus* species, however, raising the question of whether queens of different species also have different strategies for allocating their resources between defense and reproduction. To find out, Bornbusch and colleagues determined fighting claw mass and egg number of 353 egg-bearing females from 221 colonies of six eusocial snapping shrimp species in the Caribbean.

In queens of snapping shrimp species that are weakly eusocial, the researchers found strong trade-offs between fighting claw mass and egg number. In contrast, this trade-off was smaller or absent in queens of species that are strongly eusocial. In addition, [colony](#) size was also a factor: in large colonies of highly eusocial species, trade-offs between queens' weaponry and fecundity were smaller. This work suggests that in snapping shrimp species that are less cooperative, female-female conflict within the colony has selected for queens that retain weapons at a significant cost to fecundity. Conversely, in [species](#) that are more eusocial—notably those with a single [queen](#) per colony—protection by other colony members could be an explanation to a reduction in this cost of weaponry in queens.

"We find that in eusocial *Synalpheus* shrimp, female-female competition and reproductive skew play a role in shaping a trade-off in queen energy allocation between reproductive success and defense weaponry," says Bornbusch. "These findings suggest that the evolution of eusociality in *Synalpheus* [shrimp](#) has left a signal in the allometry of female [reproduction](#) and defense."

More information: Bornbusch SL, Lefcheck JS, Duffy JE (2018) Allometry of individual reproduction and defense in eusocial colonies: A comparative approach to trade-offs in social sponge-dwelling *Synalpheus*

shrimps. *PLoS ONE* 13(3): e0193305.
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