

Crabs, lobsters and shrimp now have a family tree dating 500 million years

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FIU marine sciences professor Heather Bracken-Grissom. Credit: Florida International University

Researchers have for the first time traced the roots of crabs, lobsters and shrimp to create the family tree of crustaceans people love to eat.

The tree shows the 450-million-year evolution of these 10-legged decapods, when lobsters and crabs each diversified from a single evolutionary origin. Groups of [shrimp](#) evolved earlier.

The findings are part of a massive family tree project where researchers resolved the deep evolutionary relationships between crabs, shrimp and lobsters. The discoveries made by analyzing more than 400 genes from 94 species could also inform conservation policies to ensure their longevity.

"Understanding the origins of biodiversity across half a billion years in groups that are extremely ecologically and economically important is fascinating," said FIU marine sciences professor Heather Bracken-Grissom, the anchor author of the study. "This is extremely important since studying and preserving biodiversity needs to be at

the forefront of our efforts in the biological sciences and across humanity"

The boom of diversification for [crabs](#), lobsters and shrimp may coincide with the spread of modern reef-building corals, Bracken-Grissom said. It is possible the emergence of reef-building corals provided new habits for decapods to colonize and diversify, leading to the emergence of several new lineages after the mass extinction of life on Earth 250 million years ago.

While the study produced the largest amount of genetic information about decapods, more work remains to be done including the addition of more species to better understand species-level relationships. The researchers hope the newly generated genomic resources will be used by others interested in decapod crustaceans for years to come.

"When we started this work in 2013, most studies that looked at the evolutionary relationships of decapods were based on [physical traits](#), and the genetic work that had been done was very limited in scope," said lead author Jo Wolfe, a post-doctoral researcher at Harvard University and former Gerstner Scholar at the American Museum of Natural History. "It was challenging to jump into this project on such an ancient and species-rich lineage without relying on the experience of others."

The study was published in the journal *Proceedings of the Royal Society B*.

More information: Joanna M. Wolfe et al. A phylogenomic framework, evolutionary timeline and genomic resources for comparative studies of decapod crustaceans, *Proceedings of the Royal Society B: Biological Sciences* (2019). [DOI: 10.1098/rspb.2019.0079](https://doi.org/10.1098/rspb.2019.0079)

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