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Australian research partnership maps the black tiger prawn genome

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By Responsible Seafood Advocate

James Cook University, CSIRO and others aim to improve *Penaeus monodon* productivity and efficiency

A collaboration of research institutes and industry has mapped the genome of an iconic Australian seafood species, the black tiger prawn (*Penaeus monodon*), to help the farming of the shrimp more productive and efficient.

“The idea was to improve the capability of Australian prawn farmers to apply selective breeding practices to produce larger and healthier farmed prawns. As part of this project, we set out to sequence the genome of the black tiger prawn. The information in the genome is important for us to know, as it essentially contains the blueprint that determines the makeup and behavior of the prawn,” said James Cook University Professor of Aquaculture Dean Jerry.

Jerry said the research came out of the ARC Industrial Transformation Research Hub for Advanced Breeding, a collaboration between JCU, the Australian Genome Research Facility (AGRF), the University of Sydney, CSIRO and Seafarms Group. Genetic selection can greatly enhance breeding efforts, he added.

“The prawn is a tiny animal, but its genome is almost as large as a [human’s] and is much more



James Cook University, CSIRO and other Australian researchers seek to improve the productivity and efficiency of the black tiger shrimp (*Penaeus monodon*) aquaculture sector. Photo courtesy of JCU.

complicated in its structure,” said Jerry.

A blue banner for Best Seafood Practices certification. On the left, there is a photo of a person in a yellow protective suit and mask handling seafood. In the center, there is a photo of a fishing boat on the ocean. To the right of the photos, the text reads: "A comprehensive solution for the wild seafood supply chain." Below this text are three checkmarks with the following labels: "Crew rights", "Food safety", and "Environmental responsibility". On the far right, there is the Best Seafood Practices logo, which consists of a stylized eye icon and the text "Best Seafood Practices". Below the logo is a button that says "LEARN MORE" with a right-pointing arrow.

(<https://bspcertification.org/>).

AGRF Bioinformatics Manager Dr. Kenneth Chan said the genetic mapping process to reconstruct the genome of the black tiger prawn was complicated.

“Imagine the task of putting together a 1.9-billion-piece double-sided puzzle with no borders, long repeated overlapping sections, millions of missing pieces, multiple pieces that can fit in the same place, no picture on the box to follow, and possibly lots of pieces from another unrelated puzzle,” said Dr Chan.

The scientists also found something very unusual in the way.

Dr. Nick Wade, senior research scientist with CSIRO, said the way that the tiger prawn fights viral infections – its Endogenous Viral Element, or EVE – is unique. “No EVE found in any other animal looks like this,” said Wade. “Discovery of this EVE allows for further research into understanding how prawns deal with infections by viruses and perhaps into new therapies that can be applied to make prawns more resistant to viral diseases.”

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Author



RESPONSIBLE SEAFOOD ADVOCATE

editor@globalseafood.org (<mailto:editor@globalseafood.org>).

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