

# Red crabs lead the way in endurance running

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Christmas Island red crabs (*Gecarcoidea natalis*) Image by Mrinalini, Bangor University

(PhysOrg.com) -- Not even professional athletes would consider running a marathon without any training, but this is essentially what Christmas Island red crabs do every year, according to new research from the University of Bristol.

Native to Christmas Island in the Indian Ocean, the red land [crabs](#) (*Gecarcoidea natalis*) spend the dry season relatively inactive in their rainforest burrows. When the monsoon comes, they embark on an annual five-kilometre breeding migration to the ocean. In a test of great endurance, the crabs travel for up to 12 hours over five days before finally reaching their destination.

Researchers from the University of Bristol's School of Biological Sciences wanted to discover how the crabs switch from hypoactivity to hyperactivity in order to carry out this remarkable athletic feat with no

training.

Professor Steve Morris and colleagues carried out [genetic analysis](#) on samples of leg muscles from the crabs during their migration journey and sixth months afterwards. They found that the crabs made major physiological changes to their muscle composition over a very short time to sustain aerobic high-endurance muscle for their trek to the coast.

By examining the versions of genes that were expressed, the team could see that for most of the year, the crabs' muscles were tuned only for short sprints. However, when the monsoon arrived, the crabs' muscles underwent a dramatic change, becoming aerobic and highly resistant to fatigue. This allowed the crabs to be on the move for up to 12 hours a day during their monsoon season trek to the coast compared with an average of just 10 minutes during the dry season when they remain mostly inactive in their inland burrows.

Tragically, Professor Morris did not live to see this research published as he was killed in a traffic accident in August 2009.

His colleague, Professor Mark Viney, said: "Steve was a traditional physiologist and this was the first time that he had done a study at the molecular level. It was a brave new departure for him and this paper is the first manifestation of this new direction of his research. Steve never let anything stop him and we took that spirit on to get this paper out."

The research is published in the May issue of *The Journal of Experimental Biology*.

**More information:** Journal paper: [jeb.biologists.org/cgi/content ... abstract/213/10/1740](http://jeb.biologists.org/cgi/content/abstract/213/10/1740)

Provided by University of Bristol

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