

How the chilli got its heat

Lead Supervisor: Dr Paula Kover, Department of Biology & Biochemistry

Project description:

Chilli plants are unique in producing capsaicin compounds, which are responsible for the heat sensation present in chilli peppers. In addition to their culinary use, capsaicinoids are also used in the pharmaceutical industry for pain management; and in nature they have been found to have antimicrobial properties. The biochemical pathway that leads to the production of capsaicin is complex, but most proteins involved in the pathway are also present in many other plants. So how has this pathway evolved to produce this new and unique trait in Chillies?

How new functions evolve in complex organisms is poorly understood. At the biochemical level, it has been suggested that new functions should arise from gene duplications followed by divergence and evolution of new functions. In this project we will explore natural variation in capsaicinoid production within the *Capsicum* genus to better understand the relationship between variation in sequence and gene expression with the evolution of heat. This project will use genomic and transcriptomic techniques to evaluate sequence and expression variation of the genes involved in the capsaicin biochemical pathway. Comparative analysis of these data will allow testing the role of gene duplications, sequence divergence and expression on the emergence of capsaicinoid production. Time permitting; we will also address the potential role of ecological differentiation in capsaicinoids diversity using microbiological essays.

Candidate:

Applicants should hold, or expect to receive, a First Class or high Upper Second Class UK Honours degree (or the equivalent qualification gained outside the UK) in a relevant subject. A master's level qualification would also be advantageous.

Applications:

Informal enquiries should be directed to Dr Paula Kover, pxk20@bath.ac.uk.

Formal applications should be made via the University of Bath's [online application form](#).

On the application form, please ensure that you quote 'Evolution Education Trust' in the Finance section and the supervisor's name and project title in the 'Your research interests' section. Should you wish to be considered for more than project, quote the projects in order of preference and upload a separate personal statement relevant to each one.

Please see our Doctoral College website for [more information on how to apply](#) for a PhD at Bath.

Application deadline: 30 April 2019.

Interviews will take place in Bath on 14 June 2019.

Anticipated start date: 30 September 2019.