Parasitic wasp database explores the genetic world of tiny stingers

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Image of the wasp Nasonia

Parasitic wasps are able to survive by keenly predicting the changing of the seasons based on the length of days throughout the year - and a new online database launched by the University of Leicester explores the genetic explanation for how.

Researchers from the Tauber lab at the University of Leicester's Department of Genetics have launched the online database, called WaspAtlas, to provide insights into the genetics and molecular data of the parasitic wasp Nasonia.

The database, created by University of Leicester PhD student Nathaniel Davies, will provide information about gene annotation, gene expression as well as DNA methylation in the Nasonia wasp.

Nasonia is an emerging model organism in various areas of biosciences including embryonic development, neuroscience and evolution.

Dr Eran Tauber, Lecturer in Molecular Evolution at the University of Leicester's Department of Genetics, who led the project, explained: "Model organisms, such as the fruit-fly and the zebrafish, have been vital for genetic research, and having an effective genomic database is indispensable for their success.

"Until recently, Drosophila has been the major insect model, offering researchers various advanced genetic tools.

"However, this is going to change since we now have cutting-edge tools that allow us to use other insects for research. Nasonia provides a few advantages for research that rival Drosophila, such as the presence of DNA methylation which is important for epigenetics."

To date there are only a few popular large insect databases such as FlyBase (for the fruitfly Drosophila), The Arabidopsis Information Resource (TAIR, for the plant Arabidopsis), and WormBase (on Caenorhabditis elegans).

The teams hopes that WaspAtlas will provide a similar service to the Nasonia research community, providing researchers with tools for

designing and carrying out their experiments.

Nathaniel Davies said: "We have received great feedback from Nasonia researchers, and hundreds of visitors from all over the world have accessed WaspAtlas.

"The huge amount of data that the database curates and the complexity of the computational processes require extremely strong hardware. WaspAtlas is based on the computer servers maintained by the University of Leicester's IT services and we are grateful for their continuous help."

Dr Tauber added: "We hope that WaspAtlas will be useful to broad range of researchers. Closely related wasp species are being used today for biological pest control, and the database would be also useful for honeybee researchers, as the genome is evolutionary closely related."

The research team's own interest in Nasonia is the strong seasonal response the wasp exhibits. Their research investigates the molecular basis of the photoperiodic clock - how animals use the annual change of the day-length to predict the coming season.

The photoperiodic response is robust in wasps, where the shortening of the day in the winter induces development arrest.

WaspAtlas, along the new genomic techniques, will help the team understand how the photoperiodic clock works.

WaspAtlas can be accessed at the following link: www.WaspAtlas.com

More information: Nathaniel J. Davies et al. "WaspAtlas: a gene database and analysis platform," *Database* (2015). DOI: 10.1093/database/bav103