

Spider secrets decoded in world-first database

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(PhysOrg.com) -- Queensland scientists have developed a world-first database that catalogues the venom components from hundreds of spiders.

Treasurer and Minister for Employment and Economic Development Andrew Fraser said scientists worldwide were now better able to investigate how [spider](#) toxins could be put to good use as natural insect sprays or pain killers.

“The ArachnoServer online database catalogues information on the DNA sequence, 3D structure and function of hundreds of venom proteins and their genetic make up,” Mr Fraser said.

Launching the web resource, Mr Fraser got up close and personal with a few of the eight-legged creatures at The University of Queensland's Institute for Molecular Bioscience (IMB) in Brisbane.

“The ArachnoServer database has brought together reams of scientific data on venom discovered by scientists over the years and it is a dedicated place where further research finds can be shared.

“The Queensland technology is being used globally by scientists exploring how spider venom may hold the key to treatments that are more effective and better for our environment and health.

“The IMB and the Queensland Facility for Advanced Bioinformatics

(QFAB) - a university, government and research collaboration located at the University of Queensland - are the brains behind the innovative ArachnoServer database.”

The Queensland Government committed \$1.9 million in 2007 through the first round of the National and International Research Alliances Program to establish QFAB. Other key project partners include the e-Health Research Centre and the ARC Centre of Bioinformatics.

Mr Fraser said Queensland was a world leader in bioinformatics - the use of IT in biology research.

“Scientists use and gather large volumes of data in their work and it's essential in today's global, online research environment to have effective information management systems,” he said.

“The ArachnoServer database is a cutting-edge addition to labs around the world that have spider proteins under the microscope.”

IMB's Professor Glenn King, who has studied spider toxins for a decade, said spider venom was complex and contained hundreds of unique proteins.

He mostly works with Fraser Island funnel-webs, one of the few deadly spiders out of the world's 40,000 species.

“This spider produces more than 1500 different venom peptides - only one is toxic to humans and the rest can be harnessed for useful purposes, such as killing [insects](#) without harming vertebrates, or targeting specific receptors in the body to relieve pain without causing side effects,” Prof King said.

US-born PhD student Maggie Gentz who was attracted to Queensland

because of the Arachnoserver and IMB facilities believes the Fraser Island funnel-web could hold the key to developing an environmentally friendly termite exterminator.

“Most products currently on the market can be harmful to other insects and vertebrates,” she said.

“But with the help of Arachnoserver we're isolating compounds within funnel-web venom and hope to patent a new treatment that's lethal to termites only.”

Prof King said environmentally friendly insect sprays for farm crops or even the home garden, that killed pests like caterpillars and moths, would be possible in the future.

He said he was also researching how plants could be genetically modified to grow insect-killing toxins and how toxins could possibly be used in either a repellent spray or cream for the skin which could help control the spread of dengue fever carrying mozzies.

“Another of our programs focuses on pain killers - using a tarantula [venom](#) protein to block the ion channels that send pain signals to our brain.”

Prof King said he could use the protein and DNA sequence data on ArachnoServer to replicate potentially useful compounds in bacteria and test them on insects.

QFAB chief executive officer Mr Jeremy Barker said the explosion in the number of new spider toxins being discovered led to the establishment of the ArachnoServer.

“Spiders are the biggest group of venomous animals and they have by far

the largest number of toxins, but until now they have not had a dedicated database,” Mr Barker said.

“ArachnoServer lets the scientist explore the previously unavailable wealth of knowledge in their data.”

More information: The ArachnoServer database can be accessed at www.arachnoserver.org

Provided by University of Queensland ([news](#) : [web](#))

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