

Scientists find scorpions target their venom

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Dr Jamie Seymour from JCU's Australian Institute of Tropical Health and Medicine (AITHM) said a typical scorpion predator would be a small mammal, while its prey was usually an insect. He said varieties of scorpion toxin worked better depending on whether they were used to protect themselves from predators or kill prey.

"Scorpions contain three separate subtypes of toxins that are effective against mammals only, insects only, and both," said Dr Seymour.

He said the venom mixture can be thought of as a cocktail of the different toxins.

"The question was whether the 'recipe' for this cocktail is fixed or can adapt in response to different environments and [predator](#)-prey interactions."

The research team of ecologists, chemists, and physiologists, led by Honours student medalist Alex Gangur, kept Australian rainforest scorpions under different conditions.

One group was given live crickets, another was given dead crickets, and a third group was subjected to the attentions of a taxidermied mouse to simulate a predator threat.

A colleague involved in the project, Dr Michael Smout from AITHM, said that after six weeks, scorpions exposed to the simulated predator exhibited significantly different venom chemistry compared to those not exposed to predators.

"Exposure to a simulated predator appeared to decrease relative production of toxins that would work on insects, while generally increasing the production of a section of the venom profile with activity towards mammalian, e.g. mouse, cells," said an ecologist involved with the project, Dr Tobin Northfield.

Dr Seymour said as far as the researchers could tell, it is the first time it has been shown that venom chemistry in organisms can change in response to a threat.

"It implies a rerouting of nutritional or energetic resources by the [scorpion](#) to increase relative production of different venom fractions which are responsible for toxicity to invertebrates," he said.

Dr Seymour said, among other opportunities, the finding opened up the potential for improvements in anti-[venom](#) design.

The findings have been published in the *Proceedings of the Royal Society B* journal.

More information: Alex N. Gangur et al, Changes in predator exposure, but not in diet, induce phenotypic plasticity in scorpion venom, *Proceedings of the Royal Society B: Biological Sciences* (2017).
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