

Could insect larvae help solve rape murder cases?

September 27 2017

Murdoch University forensic researchers have made a promising discovery, which could aid investigations into sexually-motivated homicide cases.

In a small pilot study, the researchers found that human DNA sourced from semen could be successfully identified in the larvae of a species of carrion fly for up to 12 days after it began feeding on biological material.

In comparison, the quantities of human DNA collected using swabs, which is the typical method used in forensic investigation, was significantly less than from the larvae after just three days.

The research findings indicate that insect samples have the potential to extend the window for the identification of sexual intercourse preceding murder.

The quantity and condition of DNA samples in forensic investigations has significant implications on the quality of the profile that can be produced. As such, this research could help law enforcement catch offenders in sexually motivated crimes of both human and animals.

Dr Paola Magni from Murdoch's School of Veterinary and Life Sciences, said more research and larger sample sizes were needed to confirm the promising findings.

"These results were generated by Murdoch University masters student Laura Nutton in a very small scale research project for her Master in Forensic Science, so it is important they are re-tested and validated in larger scale research," Dr Magni said.

"Laura used a new forensic DNA quantification kit, which is currently being introduced in working forensics laboratories, to do the experiments. Its application for this project was unique so we are sharing our results with its manufacturers."

Dr Magni, an experienced forensic entomologist in criminal investigations, said insects could help to estimate the time since death of a victim, as well as for toxicological and genetic analyses.

"In cases of sexual assault followed by homicide, the investigation can be extremely challenging due to the fast degradation of the semen evidence and the decomposition of the body driven by the activity of the vaginal microenvironment and carrion insects," she said.

"Investigating the same insects with novel techniques, we are able to retrieve pivotal information otherwise lost. This information could be the key to the case."

For the study, the larvae of *Lucilia sericata*, a primary coloniser of human remains worldwide, were provided with chicken liver mixed with donated human semen.

Larvae and semen swabs were collected for 12 days and the extracted DNA was tested with the forensic DNA quantification kit.

Both the quantity and level of degradation of the human DNA were measured.

As well as being able to identify the human DNA in the larvae for a longer period of time, the pilot study showed the [larvae](#) samples had lower levels of DNA degradation when compared to the swab samples.

Dr Magni, co researcher Brendan Chapman and Ms Nutton were invited to present their findings at the 'Frontiers in Genetics session of the Combined Biological Science Meeting' that was held in Perth recently.

Additionally, they aim to further share their research with the forensic community at the annual American Academy of Forensic Sciences conference in Seattle, United States, in February 2018.

Provided by Murdoch University

Citation: Could insect larvae help solve rape murder cases? (2017, September 27) retrieved 23 May 2024 from <https://phys.org/news/2017-09-insect-larvae-rape-cases.html>

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