Developing knowledge of blowfly life cycles to improve accuracy of estimating post-mortem interval

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Post-mortems are an essential part of the investigative process after someone has died in suspicious circumstances, usually performed to establish cause of death. Definitively proving time of death later is extremely difficult. By using blowflies and sometimes other insects, forensic entomologists can provide an estimated window of time in which someone is likely to have died. This is calculated by estimating the amount of time since eggs were first laid, which approximates (sometimes quite closely) the time of death. Such insect derived time is known as the minimum post-mortem interval (PMImin).

A new knowledge exchange project at Bournemouth University is aiming to develop an industry standard designed to make identifying time of death much more reliable by establishing a standard culturing protocol for rearing blowflies in the laboratory. Dr Andrew Whittington, Senior Lecturer in Forensic Science, is leading the new project.

"One of the ways that forensic experts can establish the time of death is by studying the lifecycle of insects that may be present on the body. Blowflies, for example, are often used as they start to lay eggs very soon after death," explains Dr Whittington. "The challenge with this is that there isn't an industry standard that helps us to understand the lifecycle of blowflies and they can grow at very different rates according to the type of species and where they are in the world.

"As an example, a type of blowfly common to Britain might not be cold tolerant in Dorset, but if the same species was found in Edinburgh, it's likely to be cold tolerant, which means it can lay its eggs and they will develop at a lower temperature. This needs to be taken into account, when calculating a post-mortem interval. At the moment, the data used doesn't reflect these kinds of variables."

Dr Whittington began to establish a benchmark for the lifecyle of blowflies through collecting samples from non-suspicious deaths. In these cases, the time of death was known, which enabled the team to pinpoint different stages of the lifecycle. Higher Education Innovation Funding (HEIF) will enable Dr Whittington to expand this by creating lab based experiments using blood agar as a rearing medium.

"At the moment, everyone is using a different procedure and different conditions, which leads to very different results. The idea behind creating a standardised industry protocol to be used in the laboratory which can establish the lifecycle of a particular species of blowfly, is that we would then have comparative conditions that can be used anywhere in the world.

"If we know that blowflies reach a certain stage of development under certain temperature conditions, we can then apply this data to a post-mortem situation, which will help forensic experts to build up a much more accurate picture of the time of death."

Provided by Bournemouth University

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