



Pathology Biology Section – 2010

G96 A Cold Case: A Forensic Review Nine Years After the Crime

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The goal of this presentation is to provide information about potential capabilities and limits of forensic entomology analyses on an old case in order to determine time of death.

This presentation will impact the forensic science community by underlining how our current understanding of the forensic sciences can help solve old cases and how important it is to have a DNA database of forensically important insects.

Three days after the disappearance of a teenage girl from a small city in the South of Italy the corpse of a girl was found in a wood not far from that city.

Immediately it was clear that the girl was murdered and moreover the crime scene appeared to be an execution. She was still clothed, but her hands and feet were tied with wire, her head was covered with a supermarket plastic bag and her eyes were hidden by a plastic tape. The murdered girl was recognized as the girl who disappeared.

The autopsy noted that she was not sexually abused, but there were many contradictory observations about the cause of death. The head of the girl sustained a bloody wound and the plastic bag over her head was not sealed properly, so there was a large mass of fly larvae on the head wound and in the eyes. The entomological evidence was poorly sampled and not used at the time, instead the level of humidity of the girl's clothes was used to determine a contradictory time of death. Many medicolegal professionals were consulted and each one wrote a different conclusion.

Two years later, the investigation led to a male suspect who was found with a note written by the girl. However, after two years of imprisonment he was exonerated.

The case was reopened six years later and the prosecutors who were handling the case decided to use another team of investigators and they also decided that a forensic entomology analysis might be useful to determine the time of death.

All entomological samples collected during the autopsy were destroyed some years before, so the work was performed with the collaboration of old and new investigators and based only on reports, pictures, crime scene and autopsy video, the girl's clothes and meteorological data from the area nearest to the crime scene.

Desiccated insect material was collected after eight years from the girl's clothes and because of the state of this evidence a morphological examination was not possible. Instead using mtDNA analyzes (COI) the insect material was determined to be *Lucilia sericata* (determined by a taxonomist).

To identify the instar of the desiccated larvae a lab experiment was designed in order to identify the original length of maggots before the dehydration process. This experiment revealed that the larvae from the body of the girl were 2nd instars of *Lucilia sericata*.

This information together with the environmental parameters and the ecological data helped to determine when the eggs were deposited and therefore the most probable time of death. The investigation is still in progress.

Investigation, Entomology, mtDNA