

# CASE STUDY – DETERMINING POST-MORTEM INTERVAL WITH FOUR BLOWFLY SPECIES (DIPTERA; CALLIPHORIDAE): THE IMPORTANCE OF CROSS ASSESSMENT

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Time elapsed since death, or post-mortem interval (PMI) is a matter of crucial importance in the investigations of homicide and other untimely deaths. Even when the cause of death is natural, time of death can have important implications. In this case study, because other tools were not available, we used insects in order to determine PMI. On 26<sup>th</sup> of September 2001, a corpse in an advanced bloated stage was discovered in a flat located in a small city (altitude 420 m a.s.l.). The corpse was lying on a bed. During investigations at the crime scene, ambient temperature was measured and reached 21.7°C. We collected several insect species including blowflies. Among this material the following adult specimens of forensic importance were identified: *Lucilia sericata*, *Lucilia illustris*, *Chrysomya albiceps*. These flies were found either on the body or within the immediate surroundings. Moreover thousands fly larvae were also present on the corpse and around. Migrating larvae, leaving the corpse were seen on the floor. Numerous samples of larvae and pupae were collected. They were rapidly brought back to the laboratory to be reared under known conditions (23°C). They were fed with meat of pig ad libidum. Development was checked every day.. Adults of the different species caught at crime scene were mounted and labelled in order to allow identification to species level and later deposited in the forensic entomological collection at the Museum of Zoology in Lausanne.

Time required for development is dependent on several factors, but the most important is temperature. It has long been acknowledged that degree-days (accumulation from egg to adult emergence) is species specific and fairly constant at normal temperatures (that is normal range activity temperatures for this species), but PMI estimates should be done by using data obtained with indigenous populations.

The 4<sup>th</sup> of October, the first species of adult's flies emerge in our laboratory. Those flies were identified as *Lucilia sericata*, *Chrysomya albiceps* and *Protophormia terranova*. Two days later (6<sup>th</sup> October) , another species appeared, *Calliphora vicina*, but no adults of this species were collected at the crime scene.

Blowflies are known to be the first colonizers of corpses and can be attracted within minutes following death. They are mostly diurnal and usually rest at night. In Switzerland, some species of blowflies may lay eggs until 10 p.m., but never by bad weather (i.e. rain) (C. Wyss, unpublished).

Meteorological data concerning the place of the crime scene were obtained and used to determine the temperature at the crime scene before the corpse was found.

According to our development tables concerning the four identified species we could demonstrate that they were all present on 16<sup>th</sup> October (+/- 24 hours) where they lay their first eggs. This was eleven days before the discovery of the body.

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