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# Methods used for the killing and preservation of blowfly larvae, and their effect on post-mortem larval length

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## Abstract

A record of the length of the largest larvae collected from a corpse can be used to estimate the age of the oldest larvae present and, therefore, give an estimate of minimum time since death. Consequently, factors that affect post-mortem larval length will impact on any estimate of PMI based on it. Methods used to kill and preserve larvae are known to affect post-mortem length. This study looks at the effects of different preservatives, and variations in the protocol used for killing larvae by immersion in a hot water bath = [hot water killed; HWK], on the length of dead larvae of two common blowfly species.

Post-feeding third instar *Calliphora vomitoria* and *Lucilia sericata* larvae were either HWK in boiling water and then placed in 80% ethanol or 10% formaldehyde solution, or

placed live into the preservatives. For both species, choice of preservative and method of killing significantly affected post-mortem length. There were significant interspecific differences in their response to identical methods of killing and preservation. Additional experiments were carried out where *C. vomitoria* larvae were HWK in water at 80 and 100°C for 1, 30, 60 and 90 s duration. Both temperature and duration significantly affected post-mortem length. Maximum length was attained after at least 60 s immersion. The amount of post-mortem decomposition that occurred after the larvae were placed in preservative could be greatly reduced by increasing the duration of immersion and/or increasing the water temperature.

For the HWK larvae, it was possible to record their length immediately after death and before they had been placed in preservative. This data revealed that where 80% ethanol was used as a preservative the larvae expanded in the preservative. The timing of this expansion was investigated with a sample of *C. vomitoria*, HWK at 100°C for 30 s and recording post-mortem length immediately after death and again after 3, 6, 9, 12, 24, 27, 30 and 33 h storage in 80% ethanol. Maximum length was recorded after 12 h storage and the rate of expansion was highest during the first 3 h in this preservative. After long-term storage (290 days), larvae killed and preserved in the same way were on average 0.7% longer than immediately after death and 0.6% (0.11 mm) smaller than when last measured (after 28 days storage).



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## Keywords

Forensic entomology; Blowflies; PMI; Larval length; Larval killing methods; Larval preservation methods

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