H41 A Study of the Differences Between Fresh Water and Salt Water Decomposition: Establishing Time Since Death or Time Since Submergence

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After attending this presentation, attendees will understand the need for more research to in order to understand decomposition in aqueous environments.

This presentation will impact the forensic science community by providing a better way to establish time since death or time since submergence in underwater death investigations.

Forensic investigators frequently become involved with cases in which decomposing human remains are recovered from aqueous environments. One important task for these investigators is to establish time since death or time since submergence. This estimation is useful to law enforcement so they can narrow their search of possible victims in order to confirm the decedent's identity. Time since death has been shown through previous research to be a tricky timeline to establish. Many environmental factors must be taken into consideration when establishing time since death and cases in which decedents have been submerged in water only serve to make this estimation more complicated. In addition to the usual suspects of ambient temperature, humidity, local insect activity and overall environment, the other factors that an aqueous environment introduce must be taken into account. These include, but are not limited to water temperature, water salinity, and micro and macro-organisms that already live in the environment that the decedent has been submerged in. To date, there have only been a small number of research projects conducted that detail the process of decomposition in aqueous environments. As a result of this, time since death determination in aqueous environments remains a tricky timeline to establish.

This project is an experimental study conducted to: (1) document the differences in the overall process of decomposition between bodies that have been submerged in freshwater and saltwater environments; and, (2) test whether time since death or submergence can be accurately estimated using previous research conducted by Seet.[1] Fetal pigs were used as a replacement for human remains because of the similarities in muscle and tissue structure. Ambient air temperature, water temperature, the pig's internal temperature, and pH were documented daily. Gross postmortem changes that occur throughout the process of decomposition as well as insect activity were also noted and documented with photographs. Bloating, purges, skin slippage, discoloration, maggot activity, fly, and beetle activity was documented in a present/absent context. The pigs were placed in buckets and kept in adequately vented cages. The cages were meant to keep out larger vertebrate scavengers while still allowing access to the invertebrate scavengers that play an active role in the process of decomposition. The freshwater was collected on site from a stagnant cranberry bog and the saltwater was collected from an urban beach in the city of Boston, MA. This research was conducted twice in two distinct seasons of spring and summer in New England.

Preliminary results from this research indicate that the environment of saltwater versus freshwater does effect the process of decomposition. Decomposition was documented as occurring faster in the freshwater than in the saltwater. Results have indicated that the saltwater hindered the decomposition process by deterring insect activity. These results also indicate the importance of the role of forensic entomologists in time since death research. Other data collected from this project will be correlated with Seet[1] to test the results of the estimation of time since submergence based on gross morphological changes. Results from that research indicate that time since submergence can be established by using variables such as the presence or absence of purge and marbling. **Reference:**

[1] Seet, BL. Estimating the Postmortem Interval in Freshwater Environments. Unpublished Masters Thesis, University of Tennessee, Knoxville, TN. 2005.

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