



## Physical Anthropology Section – 2006

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### H45 Temperature Variability in the Burial Environment

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After attending this presentation, attendees will gain a better knowledge of the relationship between body temperatures during decomposition and the ambient and sediment temperatures of the burial environment.

This presentation will impact the forensic community and/or humanity by helping in establishing time since death estimations when temperature data is used in relation to decomposition and/or insect data.

The aim of this study is to demonstrate the relationship between external body temperatures throughout decomposition and corresponding sediment and ambient temperatures of the burial context. Rates of decomposition are temperature and thus insect dependent making them useful for time since death estimations. Therefore, ambient temperature data is often used in forensic investigations in relation to rates of decomposition and/or insect evidence. Temperature data are usually collected from the nearest weather station or weather station records, which are corrected using site temperature data, but the potential variability between temperatures of the body, surrounding sediment, and air has not been well established. A better understanding of the relationship between all relevant temperatures of the burial environment will help in estimations of time since death.

In this investigation two pigs (*Sus scrofa*) were buried using two burial types, one under stone and one under sediment, in Edmonton, Alberta. A datalogger was installed next to the burials with thermistors attached to the top and bottom of the thoracic regions of each pig as well as in the sediment adjacent to one of the pigs. Ambient temperature data were collected from an on-site weather station. Temperatures were recorded for four months from July 7 to October 6, 2002. Unobtrusive observations regarding insect activity and collapse of burial provide insight as to the associated stages of decomposition.

Temperatures varied between each probe and between the probes and ambient temperature throughout the study. In no cases did the temperatures of each of the probes and ambient air exhibit the same temperature results. However, as ambient and sediment temperatures of the burial environment changed, similar changes occurred in exterior body temperatures of both anterior and posterior thoracic regions. These changes depended on factors such as burial type. Patterns are seen throughout each day and throughout the four-month time span of the study. Daily patterns tend to follow an s-shaped curve in which temperature increased throughout the day and decreased at night with some notable exceptions. Temperatures throughout the day fluctuated more among stone-covered than sediment-filled burials and more at the top of the burial than at the bottom. Body temperatures showed less fluctuation than those of both the surrounding matrix and ambient air during the four months. Temperatures on the anterior thoracic region (top of pig) were consistently warmer than the posterior (bottom of pig). Temperatures of both the top and bottom of sediment-filled burials were generally warmer than stone-covered. All temperatures followed the same general pattern of fluctuations throughout the study period.

#### **Ambient Temperature, Decomposition, Body Temperature**