



## Physical Anthropology Section – 2007

### H47 Efficient Processing of Human Remains Using Dermestid Beetles

Karen R. Cebra, MS, MSFS\*, California State University at Chico, Anthropology Department, 400 West 1st Street, Chico, CA 95929

After attending this presentation, attendees will understand the behavior and ecology of dermestid beetles in a captive, laboratory environment will be understood such that they can be used to efficiently and effectively process human remains in a timely fashion.

This presentation will impact the forensic community and/or humanity by demonstrating the advantages of using dermestid beetles in the processing of human remains found in forensic cases and by describing new methods to efficiently and effectively use and maintain a dermestid colony.

Beetles of the family Dermestidae (Order Coleoptera) are known to feed and breed on animal proteins. Places that process animal products, for example tanneries, are therefore vulnerable to infestation by dermestids. In nature, dermestid beetles are commonly found on decomposing remains in the late stages of decay – long after such species as blowflies (Family Calliphoridae) have left. The animal proteins present in raw hides and skins are suitable habitat for larval development and a single female adult dermestid can lay hundreds of eggs. The eggs hatch after about a week into larvae that undergo several molts (instars), pupate and emerge as adults. It is the larval stages that feed on the animal material; therefore, in the case of the processing of human remains, it is the larvae that clean the skeleton. The entire cycle from egg to adult varies widely depending on temperature and humidity. Increased temperature and humidity typically speed development whereas a decrease in these factors slows it. In addition to temperature and humidity, it is important to understand that remains in nature do not undergo the same succession of insect colonization as those that are processed in a laboratory environment. An argument often made against using beetles of the genus *Dermestes* (literally “skin-eaters”) to clean human remains is the time it takes for the beetles to complete the job (Byers, 2000), but with a good understanding of the ecology and behavior of the beetles, the rate at which a specimen can be cleaned can be controlled. Procedures for preparing a specimen for placement into a beetle colony describe defleshing, removing the eyes, tongue and brain, and drying. All of these ideas are predicated on the behavior of beetles in nature and each of these processes adds time in addition to the time the remains are in the colony itself. Other techniques, such as boiling, have been used in cases where the time required for beetles has been thought to be unavailable. However, these techniques pose risks to the bone, such as cracking or demineralizing, that dermestids do not. It is for this reason that the Physical Anthropology Human Identification Laboratory (PAHIL) at California State University at Chico prioritizes the use of dermestids in the processing of human remains. Such a colony has been maintained successfully for many years. A recent time-sensitive case of homicide at PAHIL which was received and completely processed from May 23 to June 6, 2006 demonstrates that, in fact, a dermestid colony can completely clean a skeleton in far less time than the literature suggests. The initial preparatory steps and maintenance of the colony used in this case in order to maximize processing efficiency and minimize the risk to the colony will be discussed. Photographs will be presented that document the daily progress of the colony and the conditions under which it was kept. Close-up photographs of bone injury will be used to demonstrate the high quality of work that can be produced by dermestid beetles.

#### Reference:

- 1 Byers, Steven N. *Introduction to Forensic Anthropology: a textbook*. Allyn & Bacon, Boston, MA. 2002.

#### Dermestid, Skeleton, Processing