



G53 Some Like It Extra-Dry: Specific Skeletonization Patterns Due to Larder Beetles (*Dermestes spp.*)

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After attending this presentation, attendees will understand how the presence of larder beetles (*Dermestes spp.*) may affect the decomposition and skeletonization processes. Through the years, several authors reported bodies discovered in flats or houses with thousands of larvae and adults actively feeding on them. However, these reports are scattered and, no study addresses this question from both anthropological and entomological point of view.

This presentation will impact the forensic science community by summarizing the cases reported in the literature, by establishing the skeletonization patterns caused by larder beetles and by offering a PMI estimation process based on adults, larvae, and molts abundance.

In a dry and warm environment, skeletonization usually occurs in a few weeks. When fly larvae (maggots) are present, they feed on soft tissues, especially the eyes or mouth. The presence of hundreds of larvae actively feeding on a corpse may thus result in a quick skeletonization of the face; however, necrophagous fly larvae avoid hard or dry tissues, and thus do not contribute to the skeletonization of feet or hands. On the contrary, larder beetles feed on dry tissues.

Dermestes spp. (larder beetles) are coleoptera species frequently observed on dry human remains. These species are well adapted to exploit all kinds of dried animal tissues: skin, fur, leather, bones, etc. They are widespread among fish and meat smokehouses or salting, in poultry houses (due to the presence of manure), or even natural history museums. Some decades ago, they were common pests of stored food products or tanneries. Hundreds of species have been reported, but only five to ten of them are commonly observed on human remains. As these species often travel with food or furs, they have a worldwide spread.

The adult female laid several egg-batches of two to twenty eggs (depending on species) in cracks or cavities of the substrate. Both adults and larvae avoid bright light. Larvae feed on surface, but burry themselves for each molt. They have seven or eight molts before pupation. Just before pupation, larvae stop feeding and move away to find a suitable place to pupate. After several days of pupation, adults emerge and start again to feed. Under favorable conditions, *Dermestes* are rapid breeders. Depending on temperature and species, an entire generation may be developed in five to six weeks. During her life, a female can lay more than 200 eggs. So, in warm conditions and with sufficient food available, *Dermestes* species may have more than five generations annually. In such cases, it is common to observe on the same place a high number of adults, larvae, molts, and frass (i.e. fecal material wrapped in peritrophic membrane).

In a forensic context, *Dermestes* (adults or larvae) are usually found from active decay phase until skeletonization. However, they are especially abundant on dry remains. They first remove flesh from limbs and face. This feeding pattern produces a quick and quite specific skeletonization of the extremities. Furthermore, larvae excrete frass in abundance. Together with molts, these residuals can create a substantial amount of material around or even inside the corpses. This is especially true for long Postmortem Interval (PMI) indoor cases, when victims are discovered several months after death. Lastly, due to the possible feeding of *Dermestes* larvae on empty puparia or dead flies, the former presence of Calliphoridae species is often difficult to assess. However, the time needed to complete several *Dermestes*' development cycles can be calculated depending on ambient temperature and species.

To be answered, the PMI estimation of such cases needs the highlight of both a forensic anthropologist and entomologist. Working together, they should be able to interpret the skeletonization and the abundance of insects to estimate the time of death.

Long PMI, Indoor Cases, Entomology